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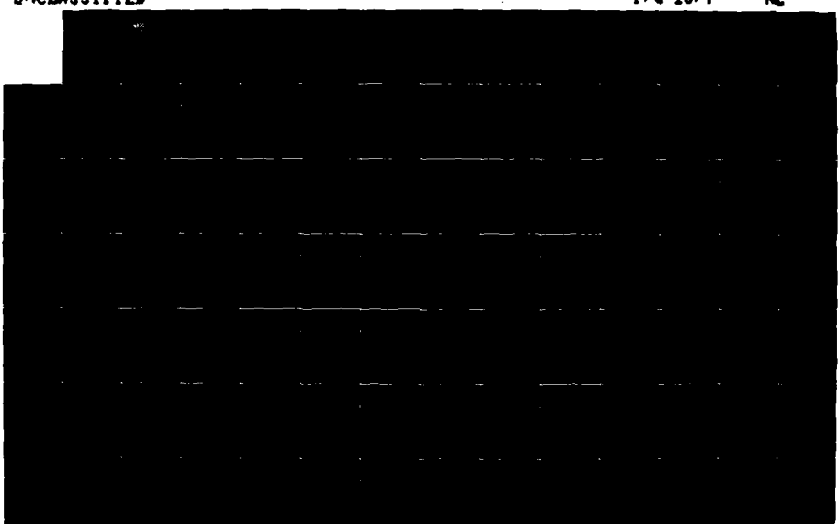

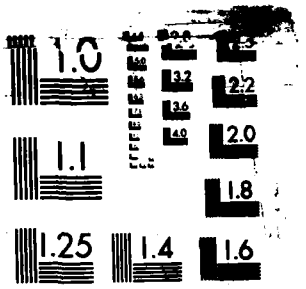

6 June 1986

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NADS

Waterwheel Program Office
TRW Defense Systems Group
2751 Prosperity Avenue
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Users' Manual for Naval Air Defense Simulation (U)

Special Programs Technical Report

Prepared for
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USERS' MANUAL

FOR

NAVAL AIR DEFENSE SIMULATION (NADS)

Last Report:
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Revised by:
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TRW
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PREFACE

The Naval Defense Simulation (NADS) is a large scale simulation of the defenses of a Carrier Battle Group, CVBG, under attack by antiship missiles launched from ships, submarines, and bombers. NADS treats with considerable detail the airborne assets of the attacking Red force and the AAW assets of the Blue defending force. A prominent feature of NADS is its simulation of the Carrier Battle Group's acquisition of tactical information by its own resources, supplemented by external surveillance information. The battle group command center maintains a continually updated "Blue Perception" of the tactical situation. All of the tactical decisions are based on that perceived picture invoked by data that are often deficient in accuracy, completeness, and timeliness.

The NADS model is organized to fit the conventional defense-in-depth zones; the outer air battle; the surface-to-air, SAM, area defense; and the terminal defenses. It should be noted that a battle force without aircraft carriers is compatible with NADS, as any element of the CVBG may be omitted. Also the aircraft capability of a land airfield can be simulated with the appropriate inputs.

The Red attack force comprises bombers, escort fighters, recon aircraft, standoff jammers, and antiship missiles (ASM) that are launched by the bombers or by ships and submarines (the Red ships and submarines are not simulated). ASMs may be characterized by as many as five phases of flight including post-launch climb, high level cruise, mid-course descent, low level cruise and terminal maneuver. Missiles may have either nuclear or conventional warheads.

The simulation calculates detections for each BLUE unit and each RED unit based on the performance characteristics of the sensor carried by the unit, the size of the target, the radio horizon, and any sweep limits for the sensor. Self-screen electronic jamming and stand-off electronic jamming algorithms are also used to calculate a time of feasible detection. Actual detection is calculated using an empirical relationship to convert the predictions of the radar equation into a detection function which more closely agrees with real-world test data. Tracking delays and decision delays are also modeled.

The model treats jammers as being in the main-lobe depending on the geometry between the jammer, the victim and the target using an input main-lobe vulnerability to main lobe jamming. Provisions exist for both two-dimensional and three-dimensional

main lobes selectable by input.

Algorithms calculate the time interval during which each jammer could be resolved by each victim in a multiple jammer enviroment. These calculations are used for both force and unit response to jamming.

When any unit succeeds in resolving a jammer in bearing, this result is reported to the command center. These data are maintained within the center and used, with appropriate errors, for generalized force tactics.

The model responds to jamming data by positioning fighter aircraft to cover the jammer. The data reported from units being jammed is used to guess a position for the jammer using the errored bearing from a unit with the least bearing uncertainty. If more than one unit in the force with the same bearing uncertainty has resolved the jammer, the range to the radio horizon of the furthest from the jammer position is used for the guess. This guess is then used to develop a bearing to the jammer from force center. A fighter is then positioned relative to this bearing. Angle off the bearing, stationing range and stationing altitude are input to the model for each type fighter.

Information that a jammer is close is an important consideration in both fighter stationing and fighter tactics. Two imprecise methods are used to cue fighters that jammers were close:

- o altitude ranging;
- o bearing ranging.

These methods are coded with the appropriate parameters in NADS.

The outer air battle is conducted by interceptors on combat air patrol (CAP) stations, deck-launched interceptors (DLI) from the carriers and fighters launched from land bases, using long range nuclear and conventional air-intercept missiles as well as close in missiles and guns. Coordinated by air controllers aboard ships or early warning aircraft which may be launched from either carriers or airfields, the interceptors normally are assigned targets by the command center but can select their own targets and engage if communications are disrupted by jamming or if the tactical situation requires urgent action. The objective is to intercept the bombers before the launch of anti-ship missiles.

Fighters are vectored toward a target by the controllers. When the fighter detects the target, the intercept is then controlled by the fighter. The fighter maneuvers to reach the

Launch Acceptable Region, a volume of space around the target for each Air Intercept Missile dependent on the geometry of the intercept and the velocities of the fighter and the target. If the fighter can not achieve intercept for any reason: not enough fuel; intercept within the minimum intercept range; not enough speed; or target out of sensor field of view during the intercept, the LAR calculations are performed and if in LAR a missile is fired. Once in LAR, a weapon is fired and the results assessed. The engagement continues until either the target is destroyed or the fighter expends available fuel or weapons. If the fighter loses detection on the carget, a request for controller support is made.

Fighter unit tactics provide for uncommitted fighter aircraft intercept of jammers when the jammer close cues were recognized. In the real world this would be accomplished by the fighter maneuvering to stop the bearing rate and then closing with the target. Fighters can employ weapons against jamming aircraft using two modes: home-on-jam with data transfer from other units, and home-on-jam on jammer close cueing.

A capability to fire air-intercept-missiles (AIM) in home-on-jam mode using data transfer from other tracking units is incorporated. This mode uses an input launch acceptable region (LAR) reduction factor in calculating time to fire. If the reduction factor is greater than one, then the reduction factor actually expands the LAR. Provision for a different probability of kill when firing in this mode is furnished.

Fighters might fire AIMs when jammer close cues are developed. In this mode, the fighter uses own altitude and the type cue received, bearing rate or elevation angle, and an assumed range of one hundred n.mi. to perform a LAR calculation. If the mode is bearing rate, the fighter assumes that the target angle is ninety degrees. If the mode is elevation angle, the assumption is that the target angle is forty-five degrees. A worst case target altitude is assumed and the target is assumed to be at 600 knots. If the fighter is in LAR for any weapon carried, a missile is fired in the home-on-jam mode. If the fighter then burns through on the target, additional AIMs will be employed.

The interceptors will engage the Red missiles when feasible, but in most instances an antiship missile that is successfully launched will penetrate to the SAM area defense zone. This result is due to the small size of the Launch Acceptable Region for Air Intercept Missiles against anti-ship missiles in general and the limited number of firing opportunities usual in such an engagement. These conclusions derive from the input characteristics of the AIM's and the ASMs.

The Surface-to-Air-Missile (SAM) area defenses are conducted by anti-air-warfare (AAW) escort ships employing conventional or nuclear surface-to-air missiles. Three levels of coordination are selectable by input: coordination by the same command center that coordinates the outer air battle; coordination by sector assignment; and every ship for itself. The ships are characterized by their radar performance, number and type of missile launchers, number of fire control channels, number and types of missiles, and their tactical data net capability. The command center assigns specific targets to individual ships, as well as assigning sectors to be covered in the absence of target assignments. Each SAM firing ship has eight firing doctrines available by input for both primary and secondary employment doctrines. Each ship manages the commitment and tie-up times of its principal subsystems in the attempt to engage all targets. NADS currently has detection queues, fire control channel queues, launcher channel queues and illuminator queues associated with each SAM ship to provide for target prioritization and engagement sequencing with preemption. Targets that the SAM systems miss or cannot engage are passed on to the terminal defenses of the targeted ships.

Force and unit tactics which defer engagement to the dive portion of the target flight for very high altitude targets are integrated into NADS. The model has the capability to preempt system resources committed to an unengageable target in a very high altitude cruise in order to engage an engageable pop-up target.

The terminal defense phase is used in NADS to establish the number of hits for the case of Anti-Ship-Missiles (ASMs) with conventional warheads, or the time and position of the bursts for ASMs with nuclear warheads. The results for both hard kill devices, such as guns and point-defense missiles, and counter-measures are simulated.

Eight nuclear weapons enviroments are calculated for each nuclear burst, AIM, SAM, or ASM. Nuclear weapons effects are computed for each ship, aircraft, and missile in the proximity of each nuclear burst. Damage is scored by comparing the computed level with the input vulnerability threshold value for each type of potential victim with the nuclear envirement created at the potential victim location.

Damage also results from the impact of conventionally armed weapons on a target. Damage is scored by cumulating the number of hits. Damage: up to six levels for ships; two levels for aircraft; and, three levels for missiles, caused during the battle on both sides reduces system capabilities for the remainder of the engagement.

The overall theme of the NADS simulation is to qualify the net performance of the defensive systems when their potential capabilities are limited by the imperfect tactical information. Because of incomplete and delayed information, in NADS as in actual combat, some targets are overengaged while others are unengaged, interceptors are placed on CAP stations too late or too soon, the stations are imperfectly placed, interceptors are sometimes assigned to fighters instead of bombers, and the launching of deck-launched interceptors (DLI) is not ideally timed. NADS was specifically designed to facilitate identification of the critical deficiencies and to evaluate the net worth of prospective ways to minimize their impact. The software has been designed in a modular form so that the effects of changes in hardware characteristics and in tactical logic can be readily examined without extensive reprogramming.

NADS was developed by the Waterwheel Program Office of TRW Defense Systems Group under contract to the Defense Nuclear Agency, and in coordination with the Office of the Chief of Naval Operations, OP-654. Continued development of the model has been sponsored by various government and corporate offices with OP-654 supervision.

A requirement of the NADS development program is the documentation of the simulation design and inputs. A prospective user can easily verify the algorithms that are used in the simulation using the documentation. This document is one of three that comprise the complete documentation of the NADS simulation:

- NADS DESIGN NOTEBOOK

  A comprehensive description of the design of NADS, covering the tactical activities and physical phenomena that are being simulated and the design of the specific software elements that are used to perform the simulations. The design rationale and compromises are described, using the diagrams and flowcharts that led to the coding of each module and subroutine.

- NADS SOURCE CODE

  The complete source code listings in GPSS and FORTRAN for all of the elements of NADS, extensively commented.

- NADS USERS' MANUAL

  User-oriented information on computer facility requirements, input data, input formats,

user-constructed data files, and operating instructions to perform NADS simulations in a stand-alone mode or in concert with other models (e.g. NNWS).

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LIST OF FIGURES

1 USER OVERVIEW

A prospective user of NADS should review the NADS Design Notebook to understand the simulation logic and software structure. The Users' Manual was developed to specify input data requirements, standard report printouts, and operating procedures. The input data requirements identify all variables that are under user control, and thus define the range of studies that can be carried out with no software changes. The standard reports that have been developed provide game statistics that will be of interest to most users. The detailed operating procedures will be of interest to a prospective "hands-on" user.

2 USER INPUT DATA

NADS input data is maintained in a set of thirty disk files that can be edited or modified by a user prior to submitting a NADS run. During NADS execution, a FORTRAN program reads the files by referring to the file number. The files and their associated file numbers are:

01 - Program Control Data

07 - Electronic Warfare Aircraft (VAQ) Characteristics

08 - Blue SAM Launcher Characteristics

09 - Early Warning Aircraft (VAW) Characteristics

10 - Blue Ship Fire Control Characteristics

11 - Blue Sensor Characteristics

12 - Blue Fighter Aircraft (VF) Characteristics

13 - Blue Air-Intercept Missile (AIM) Characteristics

14 - Blue Ship Characteristics

15 - Blue Surface-to-Air Missiles (SAM) Characteristics

16 - Red Aircraft Characteristics

17 - Red Anti-Ship Missile (ASM) Characteristics

18 - Nuclear Warhead Characteristics

19 - Red Jammer Characteristics

20 - Carrier (CV) Characteristics

21 - Blue Units

22 - Blue Air Plan

23 - Red Aircraft Scenario

24 - Red Aircraft Formation Sub-scenario

25 - Red Surface and Sub-Surface Launched Missiles Plan

28 - Blue Jammer Characteristics

29 - Miscellaneous Data

30 - Blue Active Jamming Plan

31 - Red Sensor Characteristics

32 - Blue Aircraft Characteristics - Nuclear Vulnerability

34 - Blue Ship Characteristics - Nuclear Vulnerability

36 - Red Aircraft Characteristics - Nuclear Vulnerability

37 - Red Missile Characteristics - Nuclear Vulnerability

39 - Intelligence Data on Red Aircraft

40 - External Surveillance Messages

Each of the data input files is described in the following sections. Each file includes one or more title lines. These lines are read by the program but not processed. The data fields are read according to the specification in the appropriate IFILE for that data. The contents of the title lines and the data fields may be changed, but not without making the appropriate modifications to the program.

The numerical data appearing in the input files are defined as "integer" or "real". Real data may optionally include decimal points and fractional values. Negative values may be used for either data type, where applicable.

Both the spacing between data values and the number of digits in a value is at the user's discretion. However, it is suggested that the input data be maintained in columns to make it more readable.

2.1 File 01 - Miscellaneous

Values are specified for five simple variables which control program operation. The file layout is included as Figure 2.1-1. Four title lines precede the five lines of data, where the first item on each line is a title for a variable and the second item is the value for the variable. The order of the variables may not be changed without modifying the program. The titles are read by the program, but not processed. The following is a description of the data elements.

TABLE 01

FILE 01 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	1-80	RUN TITLE	20A4	Eighty alphanumeric-character case identification
B	11-20	IPRINT	I10	Print option for detailed simulation output (dimensionless, integer)
C	11-20	JPRINT	I10	Red aircraft and missile and Blue fighter and early warning aircraft trajectories: 1 - output 0 - no output
D	11-20	RANDX	I10	Nine-digit seed for random number generator (dimensionless, odd integer)

TABLE 01 (continued)

FILE 01 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
E	11-20	ASENSR	I10	Switch to indicate whether ship or aircraft sensor transactions are created: 1 - created all sensors (ships and aircraft) will have both ships and aircraft interaction. 0 - will not create all sensors, will not have ship and aircraft interaction.
F	11-20	JAMMER	I10	Switch to control indicate whether the RED jamming portion of the scenario is to be exercised: 1 - RED jamming will be performed as entered in the scenario files for scheduled jamming and in jammer characterization files for auto jamming 0 - no RED jamming (used primarily for scenario debug to avoid changing all nodes 5 and 6 to nodes 2)

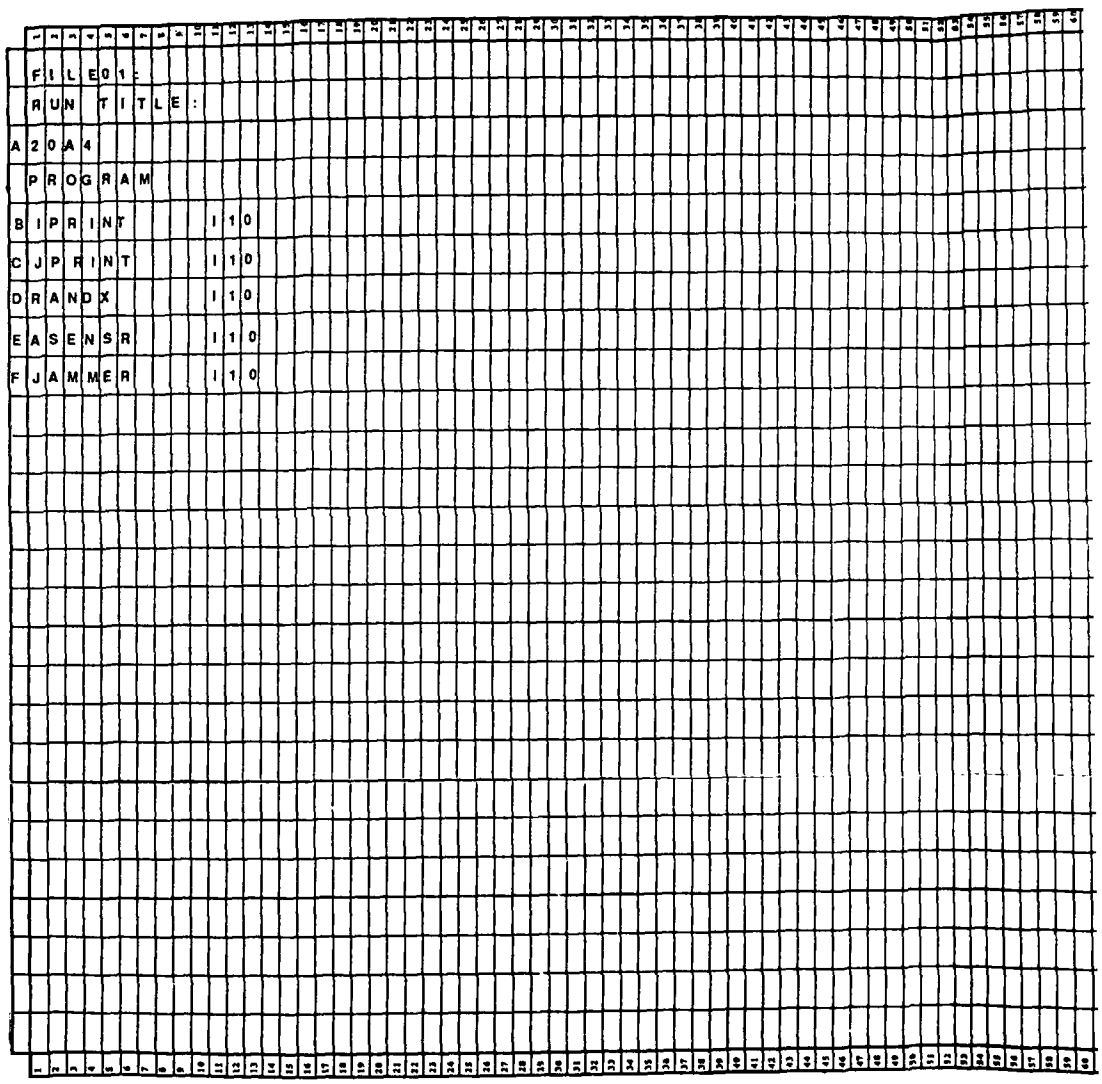

FILE01:
RUN TITLE:
A20A4
PROGRAM
BIPRINT I10
CJPRINT I10
DRANDX I10
EASENSR I10
FJAMMER I10

Figure 2.1-1

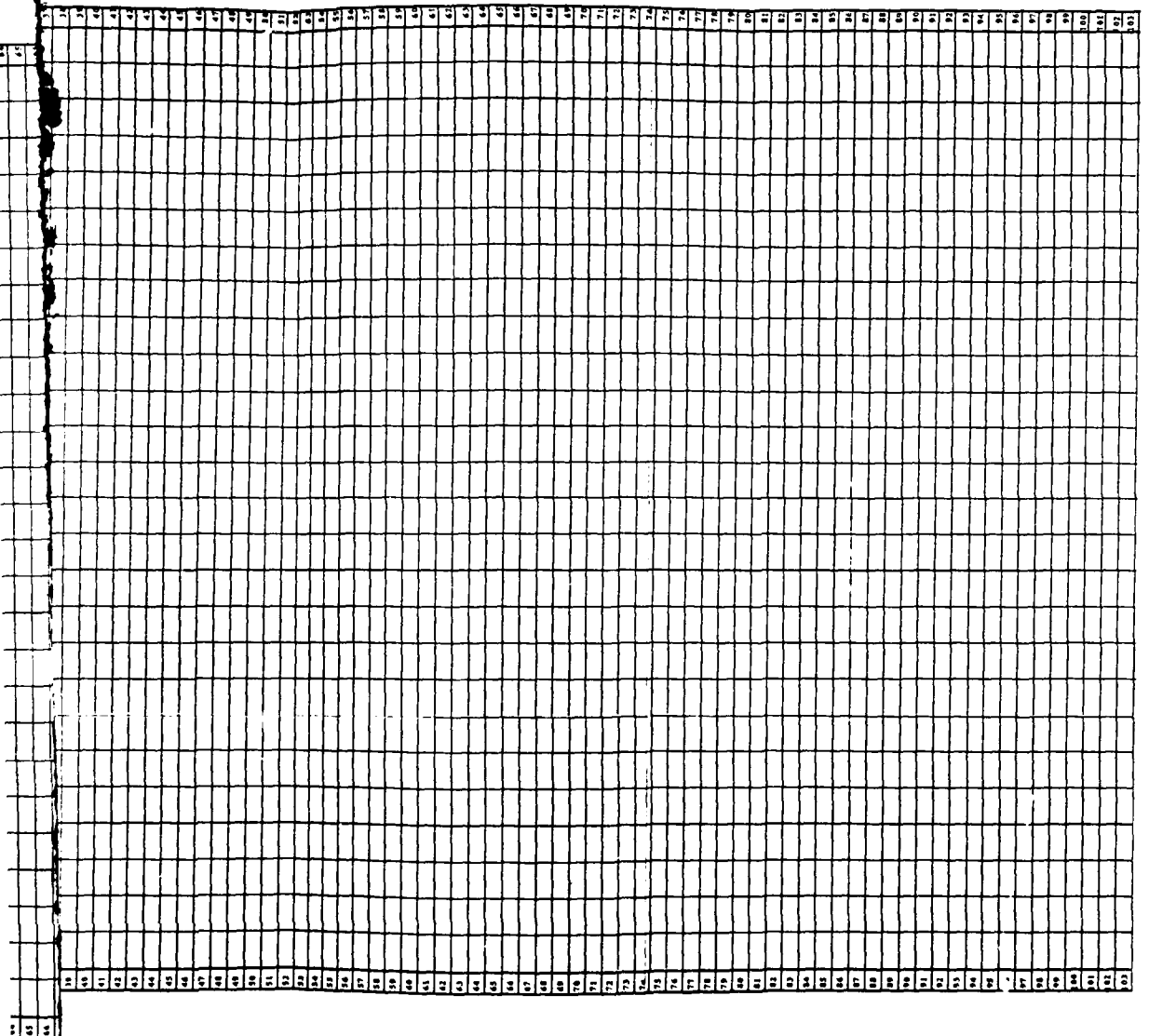


Figure 2.1-1

2.2 File 07 - Electronic Warfare Aircraft (VAQ) Characteristics

The characterization of electronic warfare aircraft: flight characteristics; and, electronic warfare suite, is specified by platform type. The file layout is included as Figure 2.2-1. Two title lines precede line image A and three column heading lines precede line image B, representing different types of VAQ aircraft. The following is a description of the data elements.

TABLE 07

FILE 07 - VAQ CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	50-52		I3	Number of aircraft types (between zero and five).
FOR EACH AIRCRAFT TYPE:				
B	1-3	PTA	I3	Platform type number (from 1 to 5 beginning with 1 and continuing in consecutive order) corresponding to a particular model or configuration of VAQ aircraft (dimensionless, integer). Examples: 1:EA-6B.
	4-5	I	I2	Index for first of three speed and fuel flow conditions, (dimensionless, integer): 1 - maximum endurance; 2 - maximum range; 3 - buster (military rated thrust); use a 1 on line image B as indicated in Figure 2.2-1.
	6-10	SPED KN	F5.0	Aircraft speed for maximum endurance, (knots, real).
	11-16	FBRNR LB/HR	F6.0	Maximum endurance fuel flow, (pounds per hour, real).

TABLE 07 (continued)

FILE 07 - VAQ CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	17-19	TM MIN	I3	Time to takeoff and climb, for normal climbout schedule (minutes, integer).
	20-24	DIST NMI	F5.0	Distance of takeoff and climb, for normal climbout schedule (nautical miles, real).
	25-29	ALT KF	F5.0	Altitude of takeoff and climb, for normal climbout schedule (kilofeet, real).
	30-34	FUEL LB	F5.0	Fuel consumed by takeoff and climb, for normal climbout schedule (pounds, real).
	35-39	FR LB	F5.0	Fuel held in reserve for emergencies (pounds, real).
	41-44	MTT MIN	F4.0	Mean-time-to-service, MTTS (minutes, real). Includes time to refuel, correct minor mechanical failures, and otherwise prepare for further flight.
	45-48	CJT	F4.0	Communication jamming threshold, not yet implemented (real).
	50-57	AC NAME	2A4	Platform name (eight alphanumeric characters).
	58-62	PDWN	F4.0	Probability of major material failure that would require extensive maintenance, such that the aircraft would be put in the hanger bay (dimensionless, real).

TABLE 07 (continued)

FILE 07 - VAQ CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	63-67	JNUM	I5	Number of jammers, corresponding to a jammer type.
	68-72	JTYP	I5	Type of jammer, integer corresponds to a Blue jammer type with characteristics specified in File 28.
C	4-5	I	I2	Index for second speed and fuel flow conditions, maximum range; use 2 on line image C, as indicated in Figure 2.2-1 (dimensionless, integer).
	6-10	SPED KN	F5.0	Aircraft speed for maximum range, (knots, real).
	11-16	FBRNR LB/HR	F6.0	Maximum range fuel flow, (pounds per hour, real).
	41-44	MTT MIN	F4.0	Mean-time-to-repair, MTTR (minutes, real) covers repair of major failure or of type 1 battle damage. NOTE: Total mean-time for return to service after major mechanical malfunction equals MTTS and MTTR.
	45-48	CTP	F4.0	Communication transmitter power, used for jamming computations not yet implemented (real).
	63-67	JNUM	I5	Number of jammers, corresponding to a jammer type.

TABLE 07 (continued)

FILE 07 - VAQ CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	68-72	JTYP	I5	Type of jammer, integer corresponds to a Blue jammer type with characteristics specified in File 28.
D	4-5	I	I2	Index for third speed and fuel flow conditions, buster (military rated thrust); use 3 on line image D as indicated in Figure 2.2-1 (dimensionless, integer).
	6-10	SPED KN	F5.0	Aircraft speed for buster, (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for buster, (pounds per hour, real).
	63-67	JNUM	I5	Number of jammers, corresponding to a jammer type.
	68-72	JTYP	I5	Type of jammer, integer corresponds to a Blue jammer type with characteristics specified in File 28.

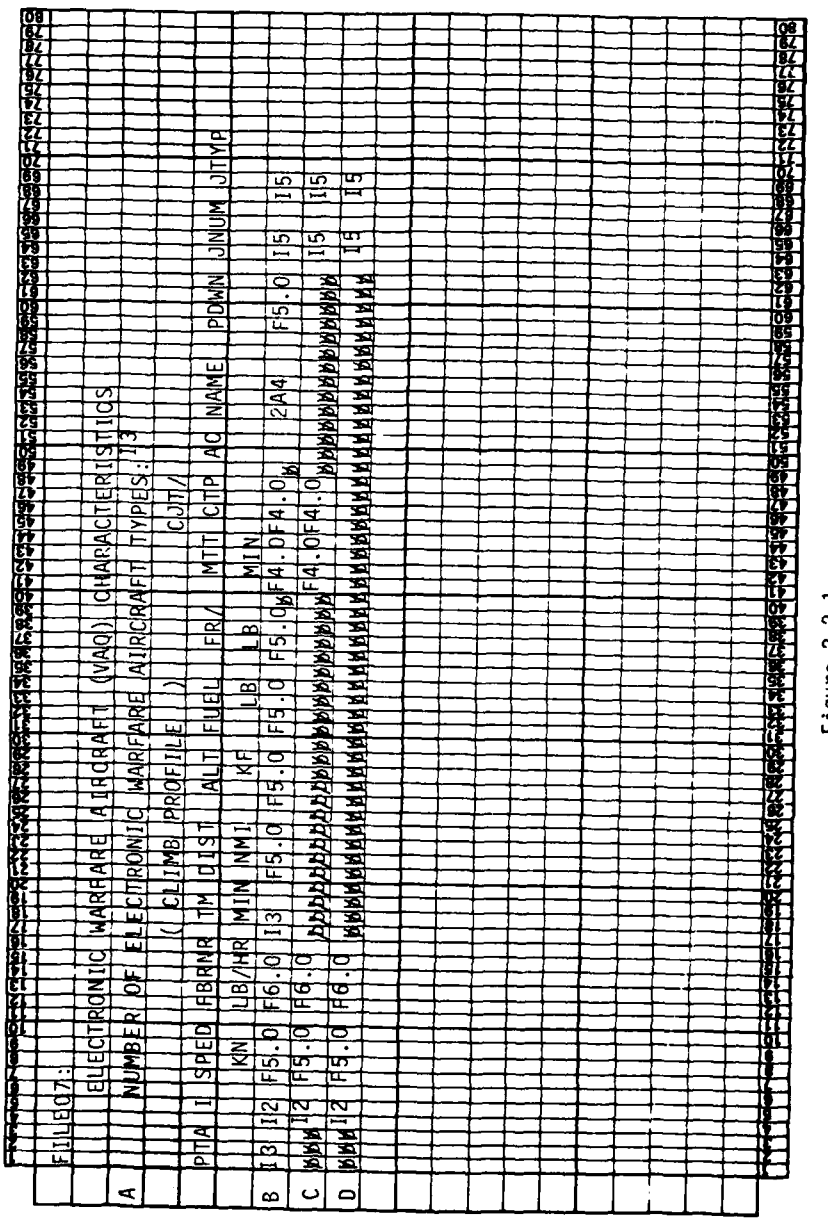

FILEQ7:
ELECTRONIC WARFARE AIRCRAFT (VAQ) CHARACTERISTICS
A NUMBER OF ELECTRONIC WARFARE AIRCRAFT TYPES: I3
(CLIMB PROFILE) CJIT/
PITA I SPED ABRNR TM DIST ALTI FUEL FR/ MTTI CTP AC NAME PDWN JNUM JITYP
KN LB/HR MIN NMI KFI LB LB MIN
B I3 I2 F5.0 F6.0 I3 F5.0 F5.0 F5.0 F5.0 F4.0 F4.0 2A4 F5.0 I5 I5
C I2 F5.0 F6.0 F5.0 F4.0 I5 I5
D I2 F5.0 F6.0 F5.0 F4.0 I5 I5

Figure 2.2-1

2.3 File 08 - Blue SAM Launcher Characteristics

The characterization of Blue SAM launching system is specified by type. The file layout is included as Figure 2.3-1. Two title lines precede line image A and two column heading lines precede line image B, representing different types of SAMs. The following is a description of the data elements.

TABLE 08

FILE 08 - BLUE SAM LAUNCHER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	40-41		I2	Number of launcher types: (between zero and ten).
FOR EACH LAUNCHER TYPE:				
B	1-3	SAM	I3	Launcher type number.
	4-8	CLAS	I5	This number points to the launcher type. SAM launcher class corresponding to a particular type of launcher: 1 - single rail; 2 - dual rail; and, 3 - vertical.
	9-18	LSNM	A10	Blue SAM launch system name (up to 10 characters).
	19-22	TSW MIN	F4.0	Time for launcher to slew to proper azimuth for launch (minutes, real). For vertical launches, this is the time to open missile hatches or other preparatory time.
	23-27	TLD MIN	F5.0	Time to load SAM on launchers (minutes, real). Use 0 for vertical launcher.

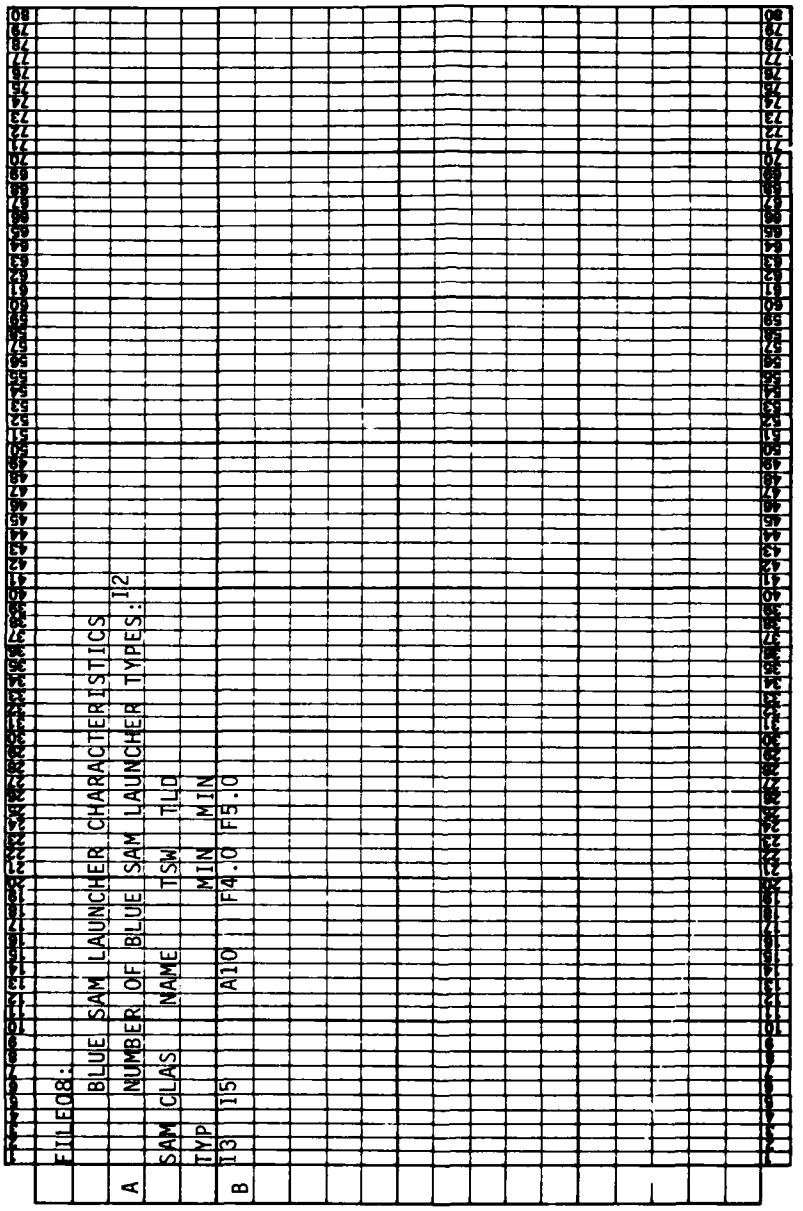

FILE08:
BLUE SAM LAUNCHER CHARACTERISTICS
A NUMBER OF BLUE SAM LAUNCHER TYPES: I2
SAM CLAS NAME TSW TLD
TYP MIN MIN
B I3 I5 A10 F4.0 F5.0

Figure 2.3-1

2.4 File 09 - Early Warning Aircraft (VAW) Characteristics

The early warning aircraft characterization: flight performance characteristics; sensor suit; and, controller capacities is specified by platform type. The file layout is included as Figure 2.4-1. Two title lines precede line image A and three column heading lines precede line image B, representing different types of early warning aircraft. The following is a description of the data elements.

TABLE 09

FILE 09 - VAW CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	45-47		I3	Number of aircraft types (between 0 and 5).
FOR EACH AIRCRAFT TYPE:				
B	1-3	PTA	I3	Platform type number (from one to five beginning with one and continuing in consecutive order). Corresponds to a particular model or configuration VAW aircraft (dimensionless, integer). Example - 1 for E-2C.
	4-5	I	I2	Index for first of four speed and fuel flow conditions, (dimensionless, integer): 1 - maximum endurance; 2 - maximum range; 3 - buster (military rated thrust). 4 - Patrolling speed. Use 1 on line image B, as indicated in Figure 2.4-1.
	6-10	SPED KN	F5.0	Aircraft speed for maximum endurance (knots, real).
	11-16	FBRNR LB/HR	F6.0	Maximum endurance fuel flow (pounds per hour, real).

TABLE 09 (continued)

FILE 09 - VAW CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	17-19	TM MIN	I3	Time to takeoff and climb to altitude for normal climbout schedule (minutes, integer).
	20-24	DIST NMI	F5.0	Distance to takeoff and climb to altitude for normal climbout schedule (nautical miles, real).
	25-29	ALT KF	F5.0	Altitude reached for normal climb; cruise altitude (kilofeet, real).
	30-34	FUEL LB	F5.0	Fuel consumed during takeoff and climb for normal climbout schedule (pounds, real).
	35-39	FR LB	F5.0	Fuel held in reserve for emergencies (pounds, real).
	41-44	MTT MIN	F4.0	Mean-time-to-service, MTTS (minutes, real). Includes time to refuel, correct minor mechanical failures, and otherwise prepare for subsequent flights.
	45-48	CJT	F4.0	Communication jamming threshold (real), not yet implemented .
	50-57	AC NAME	2A4	Platform name (eight alphanumeric characters).
	58-60	ST	I3	Sensor type number with which VAW is equipped (dimensionless, integer). Identifies radar in File 11 (Blue Sensor Characteristics) to be used on this aircraft. Examples: 1 - APS-125; 2 - AWG-9.

TABLE 09 (continued)

FILE 09 - VAW CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	61-62	S	I2	Flag indicating aircraft equipped with tactical data system (dimensionless, integer); 1 - has TDS; 0 - does not have TDS.
	63-65	AT	I3	Automatic detect and track capacity, number of enemy contacts that can be tracked and detected at the same time by this type VAW (dimensionless, integer).
	66-69	PDWN	F4.0	Probability of major material failure that would require extensive maintenance, such that the aircraft would be put in the hangar bay (dimensionless, real).
	70-73	AC	I4	Maximum number of aircraft that can be assigned to this VAW for control (integer).
	74-76	VC	I3	Maximum number of fighter aircraft that can be vectored by this VAW (integer).

TABLE 09 (continued)

FILE 09 - VAW CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C	4-5	I	I2	Index for second speed and fuel flow conditions, maximum range; Use 2 on line image C, as indicated in Figure 2.4-1. (*dimensionless, integer*):
	6-10	SPED KN	F5.0	Aircraft speed for maximum range (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for maximum range, (pounds per hour, real).
	41-44	MTT MIN	F4.0	Mean-time-to-repair, MTTR (minutes, real) covers repair of major failure or of type one battle damage. NOTE: Total mean time for return to service after repair of major mechanical malfunction equals MTTS and MTTR.
	45-48	CTP	F4.0	Communication transmitter power (real), used for jamming computations not yet implemented.

TABLE 09 (continued)

FILE 09 - VAW CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
D	4-5	I	I2	Index for third speed and fuel flow conditions, buster (military rated thrust) or maximum continuous power if appropriate. Use 3 on line image D, as indicated in Figure 2.4-1. (dimensionless, integer):
	6-10	SPED KN	F5.0	Aircraft speed for buster (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for buster (pounds per hour, real).
E	4-5	I	I2	Index for fourth speed and fuel flow conditions, patrolling speed, used since aircraft may not be able to fly at maximum range cruise for best radar antenna orientation. Use 4 on line image D, as indicated in Figure 2.4-1. (dimensionless, integer):
	6-10	SPED KN	F5.0	Aircraft speed for patrolling (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for patrolling (pounds per hour, real).

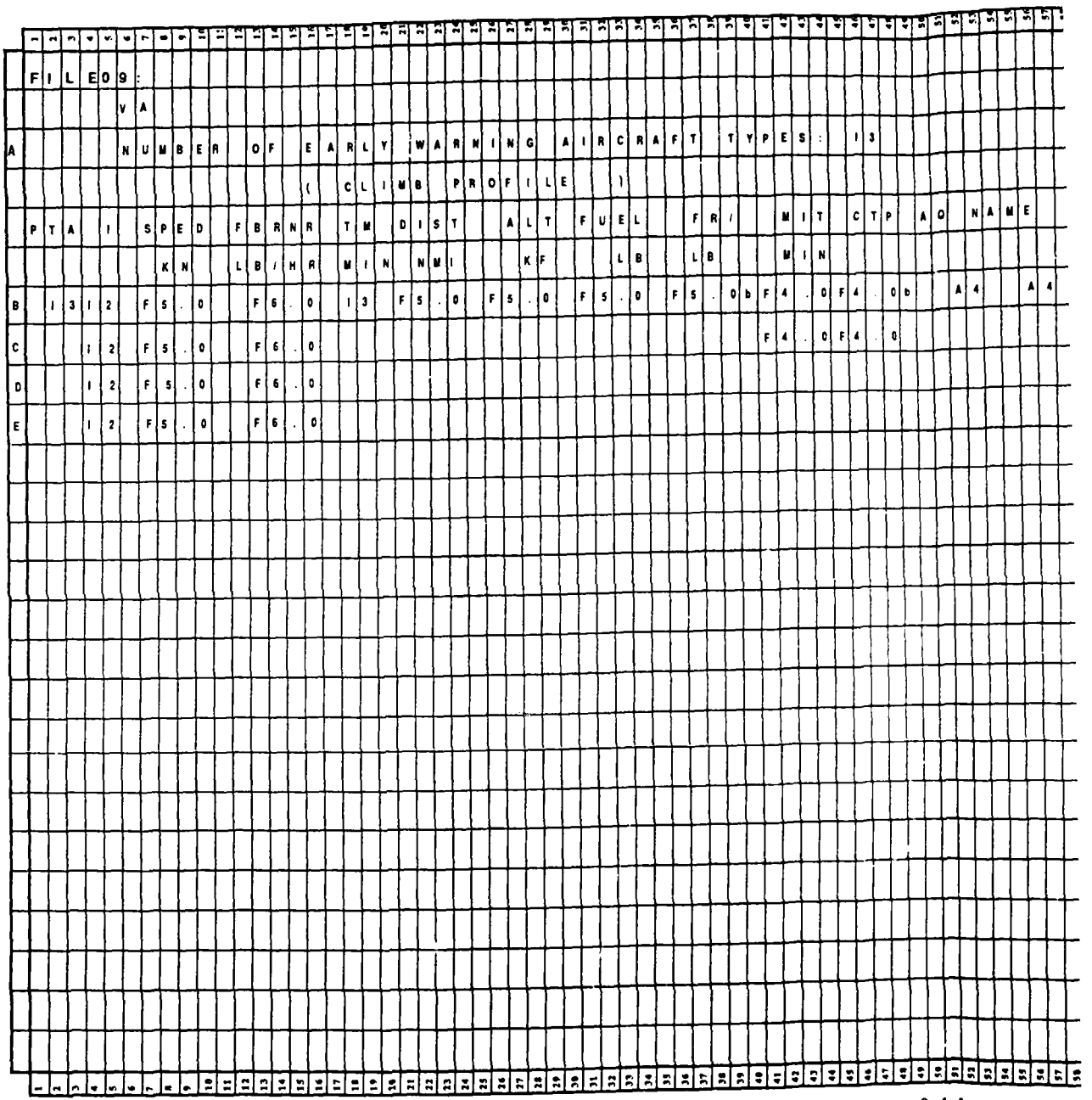

FILE09:
VA
A NUMBER OF EARLY WARNING AIRCRAFT TYPES: 13
(CLIMB PROFILE)
PTA I SPEED FBRNR TM DIST ALT FUEL FR/ MIT CTP AQ NAME
KN LB/HR MIN NMI KF LB LB MIN
B 13 12 F5.0 F6.0 13 F5.0 F5.0 F5.0 F5.0 F4.0 F4.0 A4 A4
C 12 F5.0 F6.0 F4.0 F4.0
D 12 F5.0 F6.0
E 12 F5.0 F6.0

Figure 2.4-1

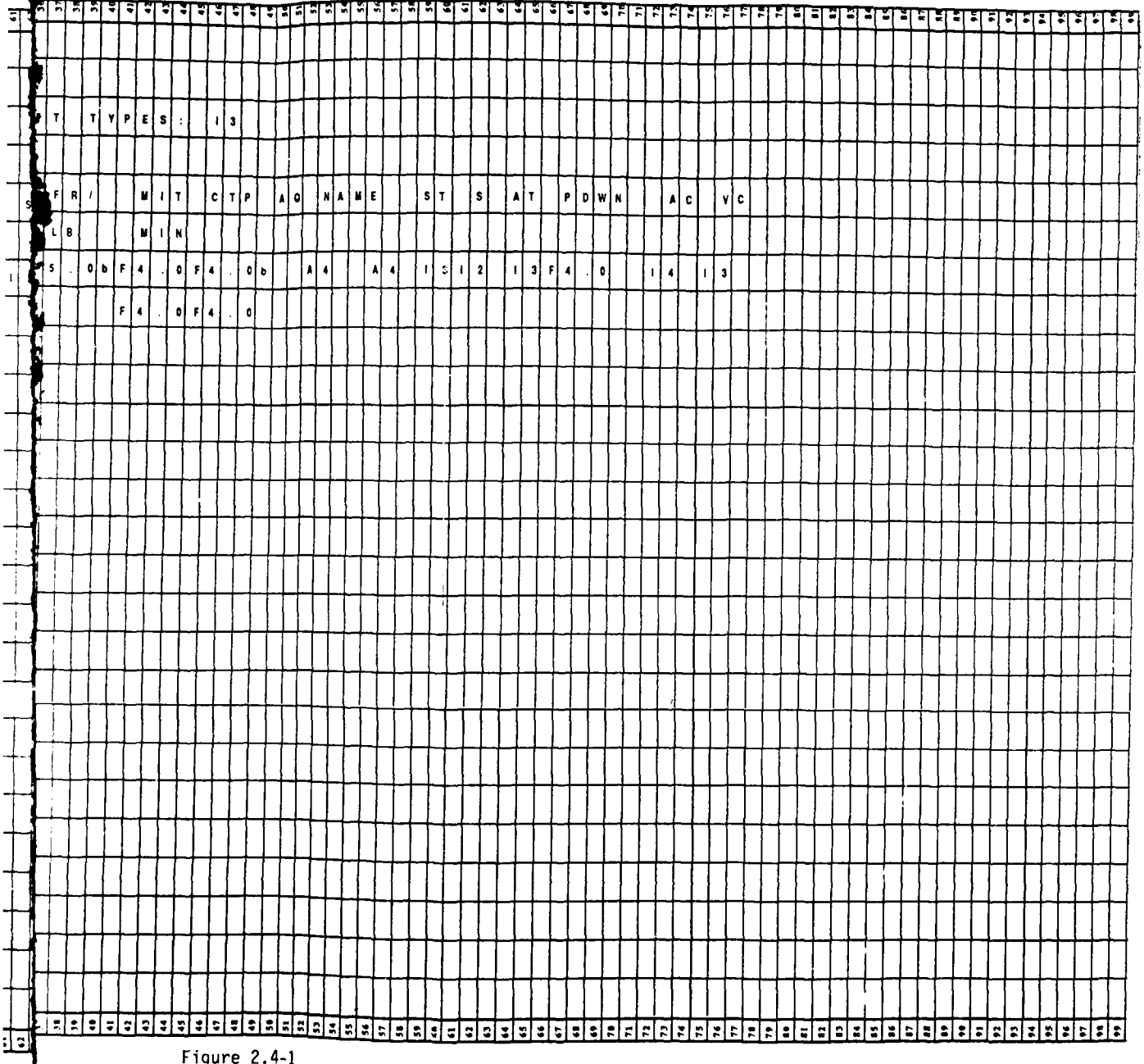

T TYPES: I3
FR/ MIT CTP AO NAME ST S AT PDWN AC VC
LB MIN
5.0bF4.0F4.0b A4 A4 I3I2 I3F4.0 I4 I3
F4.0F4.0

Figure 2.4-1

2.5 File 10 - Blue Ship Fire Control Characteristics

The system characterization: acquisition and lockon times; illuminator tie-up times; and, system capacities of Blue Surface-to-Air fire control systems is specified by type. The file layout is included as Figure 2.5-1. Two title lines precede line image A and two column heading lines precede line image B, representing different types of fire controls, each of which is composed of two lines of data. Note the values for most data elements appear only on line 1 for each fire control type, while only one data element requires a value on line 2. The following is a description of the data elements.

TABLE 10

FILE 10 - BLUE FIRE CONTROL CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	40-41		I2	Number of Blue fire control types: (between zero and ten).
FOR EACH CONTROL TYPE:				
B	1-3	FCS TYP	I3	Number of fire control types (between 1 and 10), corresponding to Blue fire control types.
	5-14	NAME	A10	Blue fire control name (up to ten characters).
	15-17	FCS CNL	I3	Number of channels in fire control system type.
	18-23	ILSAM	I6	Number of SAM illuminators/ guidance channels (dimensionless, integer). Used only on SAMs with mid-course guidance, GTY=3 in File 15.
	24-29	TLOK MIN	F6.0	Average time for fire control system to acquire target and lock on (minutes, real).

TABLE 10 (continued)

FILE 10 - BLUE FIRE CONTROL CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	30-34	TWT MIN	F5.0	Estimated time to wait for illuminator (minutes, real). Used only for SAMs with mid-course guidance, GTY=3 in File 15.
	35-39	TIL MIN	F5.0	Illuminator tie-up times for mid-course guidance when intercept range is less than or equal to the cross-over range (minutes, real). Used for SAMs with GTY=3 in File 15 only.
	40-44	RIL NMI	F5.0	Cross-over range for SAM illuminator tie-up times (nautical miles, real). Used only for SAMs with GTY=3 in File 15.
C	35-39	TIL MIN	F5.0	Illuminator tie-up times for mid-course guidance when intercept range is greater than or equal to the cross-over range (minutes, real). Used for SAMs with GTY=3 in File 15 only.

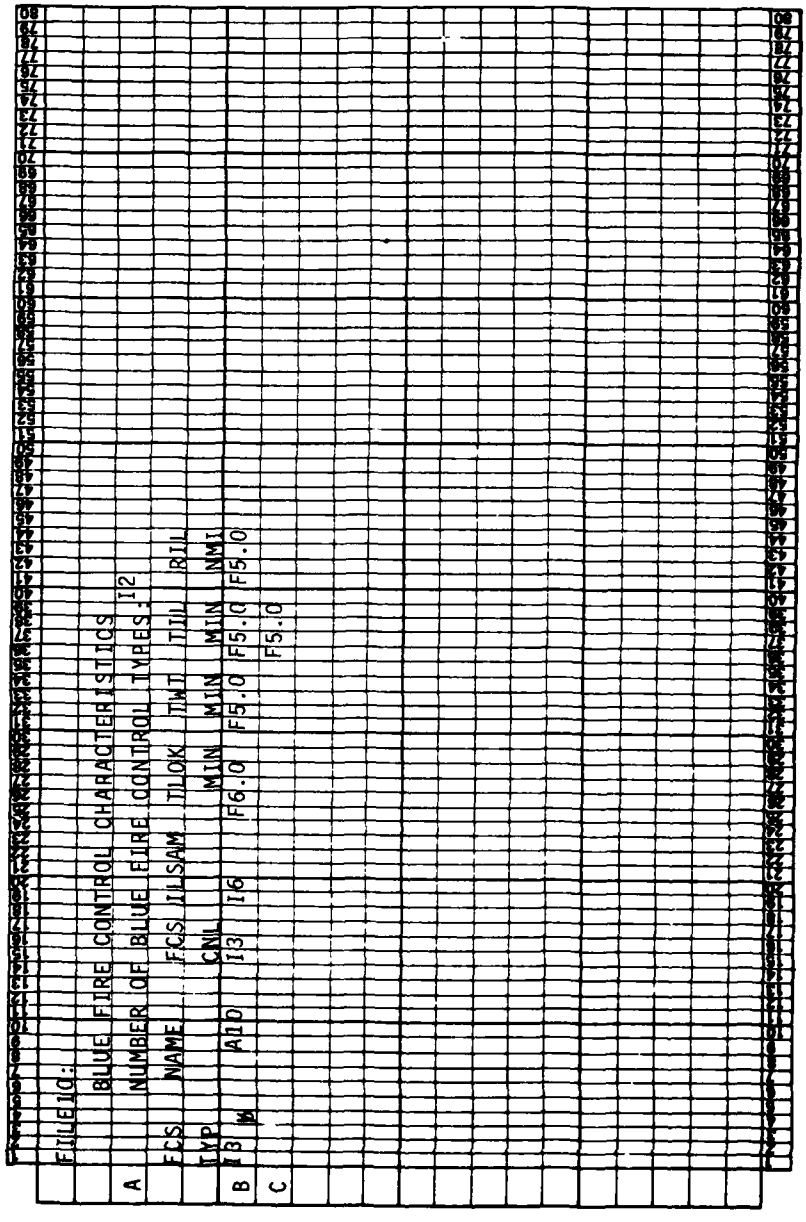

FILE ID:
BLUE FIRE CONTROL CHARACTERISTICS
A
NUMBER OF BLUE FIRE CONTROL TYPES I2
FCS NAME
FCS ILSAM TLOK TWT TTIL RTIL
CNL
EXP
B F B M
A10 I3 I6 F6.0 F5.0 F5.0 F5.0 F5.0
MIN MIN MIN NMI
C
F5.0

Figure 2.5-1

2.6 File 11 - Blue Sensor Characteristics

The sensor characterization: nominal detection ranges in both jamming and clear environment; instrumented range; parameters describing vulnerability to jamming; sector sweep limits; minimum discernible velocity for doppler radars, and, parameters of the detection delay function for Blue search radars is specified by sensor type. The file layout is included as Figure 2.6-1. Two title lines precede line image A and three column heading lines precede line image B, representing different type of sensors. The following is a description of the data elements.

TABLE 11

FILE 11 - BLUE SENSOR CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	29-30		I2	Number of sensor types (between zero and twenty).
FOR EACH SENSOR TYPE:				
B	1-2	ST	I2	Number (from one to 20) corresponding to a type of air search radar (dimensionless, integer). Examples: 1 - APS-125; 2 - AWG-9; 3 - SPY-1; 4 - SPS-40; 5 - SPS-48.
	4	FREQ BAND	A1	Designation of the frequency band for the radar: C - 0.5 - 1.0 GHZ; E - 2.0 - 3.0 GHZ; F - 3.0 - 4.0 GHZ; I - 8.0 - 12.0 GHZ; J -12.0 - 17.0 GHZ; K -27.0 - 40.0 GHZ
	9-12	RNGE BETA NMI	F5.0	Range beta: nominal, clear-environment detection range for a 1 square meter target (nautical miles, real).

TABLE 11 (continued)

FILE 11 - BLUE SENSOR CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
	13-17	RNGE ALPH NMI	F5.0	Range alpha: Burnthrough range for a 1 square meter target with a self-screen jammer operating with an effective radiated power of 1 watt per megahertz (nautical miles, real).
B (cont)	18-22	RNGE INST NMI	F5.0	Instrumented range of the radar (nautical miles, real).
	23-28	JAM BW MHZ	F6.0	Effective bandwidth for a spot noise jammer (megahertz, real).
	28-35	SIDE LOBES SUP/CNL	I7	Side lobe jammer suppression channels (channel, real).
	36-40	SIDE LOBES DB	F5.0	Average reception side lobe level below main beam (decibels, real).
	41-45	MAIN LOBE DEG	F5.0	Width of the main lobe from center of the beam (degrees, real). Used for jamming vulnerability
	46-47	3 D	I2	Indicator for three dimensional radars; i.e., does the radar have a narrow beam in elevation. 1 - indicates 3-D radar 0 - indicates 2-D radar
	48-52	SCTR ANGL DEG	F5.0	Search sector of radar (degrees, real). Includes angle covered by steerable sector limits.

TABLE 11 (continued)

FILE 11 - BLUE SENSOR CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
	DOPPLER RADARS:			
B (cont)	53-57	TBASE	F5.0	Base time of delay (seconds, real).
	58-62	N2	F5.0	Delay time multiplier (seconds, real).
	63-67	ADD	F5.0	Alerted detection delay time.

DETDLY: Detection time is calculated as a time delay after detection becomes physically possible to account for the difference between predictions based on the Radar Equation and detections observed in the real world. The average time for detection once the detection is feasible is TBASE + N2 X (number of targets detectable). If the unit is actively looking for this particular target; that is, the target has been assigned to the unit for engagement, the average delay is ADD.

	68-71	MDV	F4.0	Doppler velocity threshold for detection, minimum discernible velocity (used to select alternate radar mode), in knots
	79-82	PULSE ST	I3	Alternate radar mode index

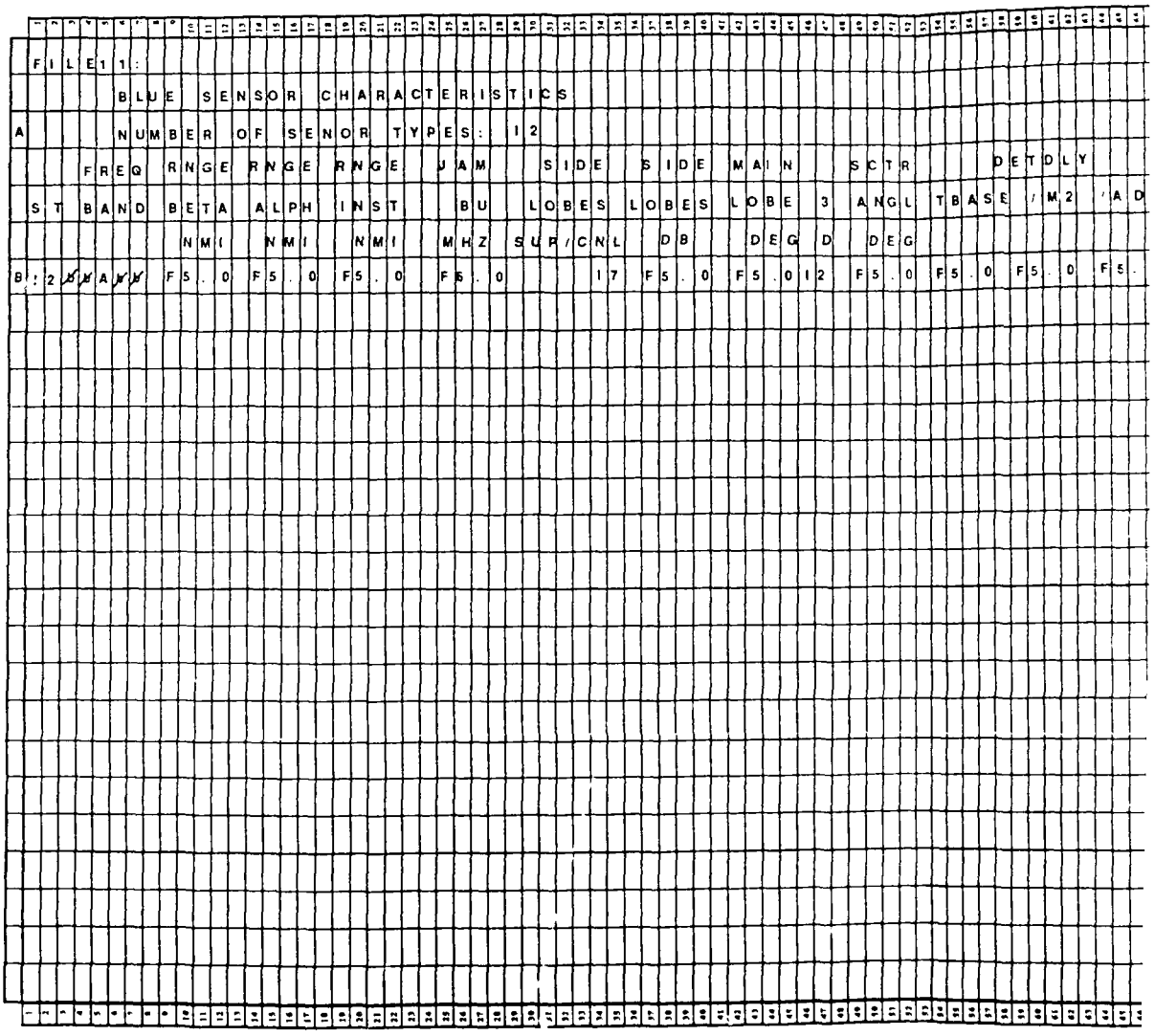

FILE11:
BLUE SENSOR CHARACTERISTICS
A NUMBER OF SENOR TYPES: 12
FREQ RNGE RNGE RNGE JAM SIDE SIDE MAIN SCTR DETDLY
ST BAND BETA ALPH INST BU LOBES LOBES LOBE 3 ANGL TBASE /M2 AD
NMI NMI NMI MHZ SUP/CNL DB DEG D DEG
B:2XXAXX F5.0 F5.0 F5.0 F5.0 17 F5.0 F5.0 12 F5.0 F5.0 F5.0 F5.

Figure 2.6-1

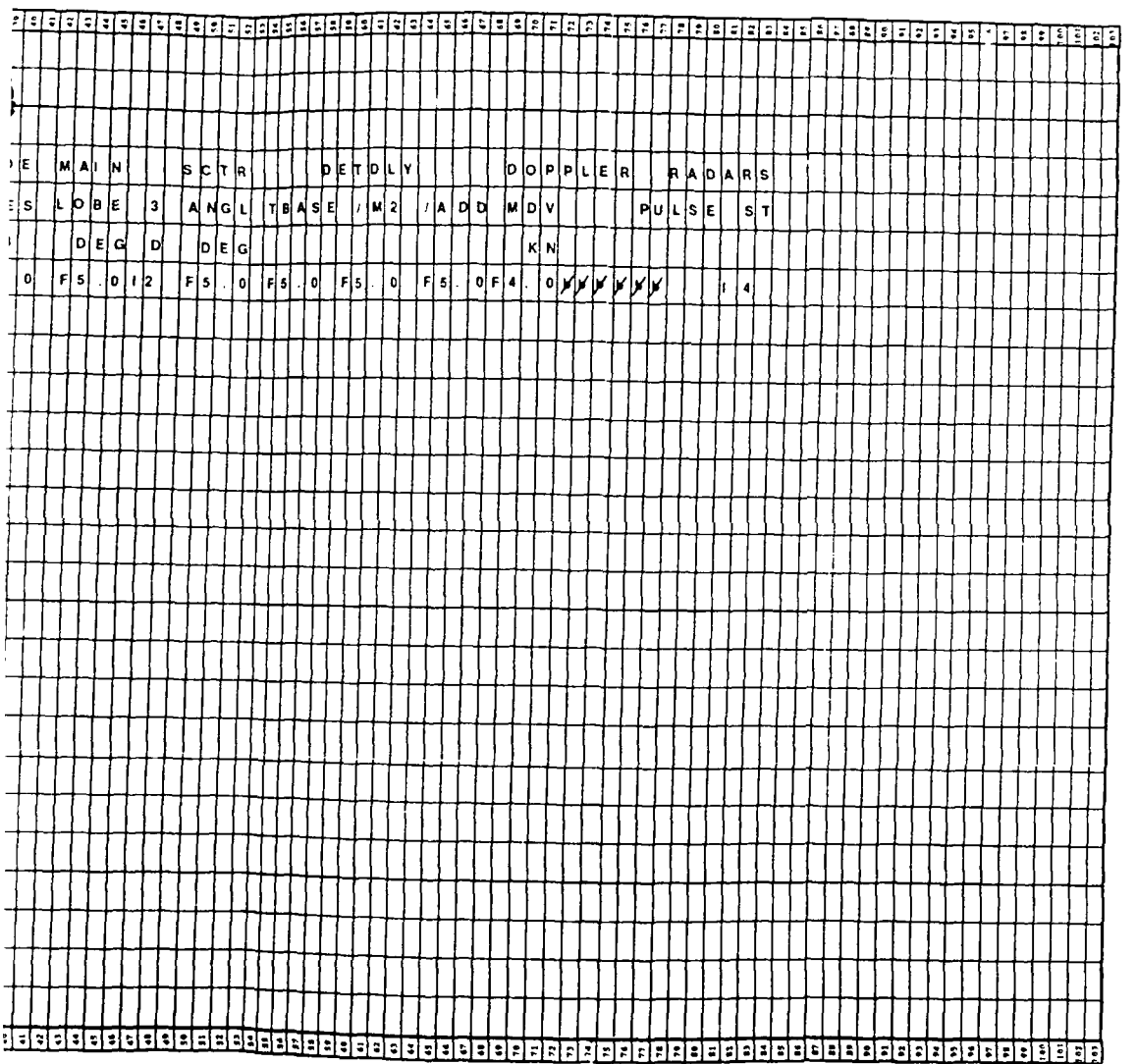

E MAIN SCTR DETDLY DOPPLER RADARS
S LOBE 3 ANGL TBASE /M2 /ADD MDV PULSE ST
DEG D DEG KN
0 F5.012 F5.0 F5.0 F5.0 F5.0F4.0 14

Figure 2.6-1

2.7 File 12 - Blue Fighter Aircraft (VF) Characteristics

The fighter aircraft characterization: climb performance; flight performance; service and repair statistics; and, sensor suite is described by platform type. The file layout is included as Figure 2.7-1. Two title lines precede line image A and three column heading lines precede line image B, each of which is composed of four lines of data. Note that values for most data elements appear only on line 1 of each platform type, while a few data elements require values on all four lines. The following is a description of the data elements.

TABLE 12

FILE 12 - BLUE FIGHTER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	31-33		I3	Number of fighter types (between zero and ten).
FOR EACH FIGHTER TYPE:				
B	1-3	PTA	I3	Platform type number (from 1 to 10), must begin with 1 and continue in consecutive order. Corresponds to a particular model or configuration of fighter (dimensionless, integer). Examples: 1:F-14.

NOTE: Weapon loads are now handled in File 22, so the same airframe with different weapon loads can be identified by a single platform type.

	4-5	I	I2	Index for first of four speed and fuel flow conditions (dimensionless, integer): 1 - maximum endurance; 2 - maximum range; 3 - buster (military rated thrust); 4 - gate. Use 1 on line image B, as indicated in Figure 2.7-1.

TABLE 12 (continued)

FILE 12 - BLUE FIGHTER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	6-10	SPED KN	F5.0	Fighter speed for maximum endurance (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fighter fuel flow for maximum endurance (pounds per hour, real).
	17-20	TM MIN	F4.0	Time to takeoff and climbout for normal (CAP) climb schedule (minutes, integer).
	21-24	DIST NMI	F4.0	Distance traveled during takeoff and climbout with normal (CAP) climb schedule (nautical miles, real).
	25-29	ALT KF	F5.0	Altitude reached for normal (CAP) climb schedule, cruise altitude (kilofeet, real).
	30-34	FUEL LB	F5.0	Fuel consumed by takeoff and climbout for normal (CAP) climb schedule (pounds, real).
	35-39	FR LB	F5.0	Fuel held in reserve for emergencies (pounds, real).
	40-44	CMBT CEIL KF	F5.0	Combat ceiling for the fighter (kilofeet, real).
	49-52	MTT MIN	F4.0	Mean-time-to-service, MTTS, includes time to refuel, rearm, correct minor mechanical failures, and otherwise prepare for subsequent flights (minutes, real).
	53-56	CJT	F4.0	Communication jamming threshold, not yet implemented (real).

TABLE 12 (continued)

FILE 12 - BLUE FIGHTER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	57-65	AC NAME	2A4	Platform name (eight alphanumeric characters).
	66-68	ST	I3	Sensor type number (dimensionless, integer). Identifies radar in File 11, Blue Sensor Characteristics, to be used on this fighter. Examples: 2 - AWG-9; 3 - AWG-10.
	69-70	S	I2	Flag indicating whether fighter has tactical data system (dimensionless, integer); 1 - has TDS; 0 - does not have TDS.
	71-73	AT	I3	Automatic detect and track capacity, number that can be tracked and detected at the same time for fighter (dimensionless, integer).
	74-77	PDWN	F4.0	Probability of major material failure that would require extensive maintenance, such that the fighter would be put in the hanger bay (dimensionless, real).
C	4-5	I	I2	Index for second speed and fuel flow conditions, maximum range; Use 2 on line image C, as indicated in Figure 2.7-1. (dimensionless, integer):
	6-10	SPED KN	F5.0	Fighter speed for maximum range, (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for maximum range, (pounds per hour, real).

TABLE 12 (continued)

FILE 12 - BLUE FIGHTER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	17-20	TM MIN	F4.0	Time to takeoff and climbout for minimum time to intercept, Deck Launched Interceptor, climb schedule (minutes, integer).
	21-24	DIST NMI	F4.0	Distance traveled during takeoff and climbout for minimum time to intercept, Deck Launched Interceptor, climb schedule (nautical miles, real).
	25-29	ALT KF	F5.0	Altitude reached at end of minimum time to intercept, Deck Launched Interceptor, climb schedule (kilofeet, real).
	30-34	FUEL LB	F5.0	Fuel consumed by takeoff and climbout during minimum time to intercept, Deck Launched Interceptor, climb schedule (pounds, real).
	35-39	FI LB	F5.0	Fuel planned for intercept, combat fuel required, (pounds, real).
	45-48	ER	F4.0	Exchange ratio - number of Red fighter escorts lost for every BLUE fighter lost, (dimensionless, real).
	49-52	MTT MIN	F4.0	Mean-time-to-repair, MTTR, covers repair of major failure or of type one battle damage, (minutes, real). NOTE: Average time for return to service after repair of major mechanical malfunction is the sum of MTTS and MTTR.
	53-56	CTP	F4.0	Communication transmitter power, used in jamming computations, not yet implemented (real).

TABLE 12 (continued)

FILE 12 - BLUE FIGHTER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
D	4-5	I	I2	Index for third speed and fuel flow conditions, buster (military rated thrust); Use 3 on line image D as indicated in Figure 2.7-1. (dimensionless, integer):
	6-10	SPED KN	F5.0	Speed for buster (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for buster (pounds per hour, real).
E	4-5	I	I2	Index for fourth speed and fuel flow conditions; gate, high speed. Use 4 on line image D as indicated in Figure 2.7-1. (dimensionless, integer):
	6-10	SPED KN	F5.0	Fighter speed for gate (knots, real).
	11-16	FBRNR LB/HR	F6.0	Fuel flow for gate (pounds per hour, real).

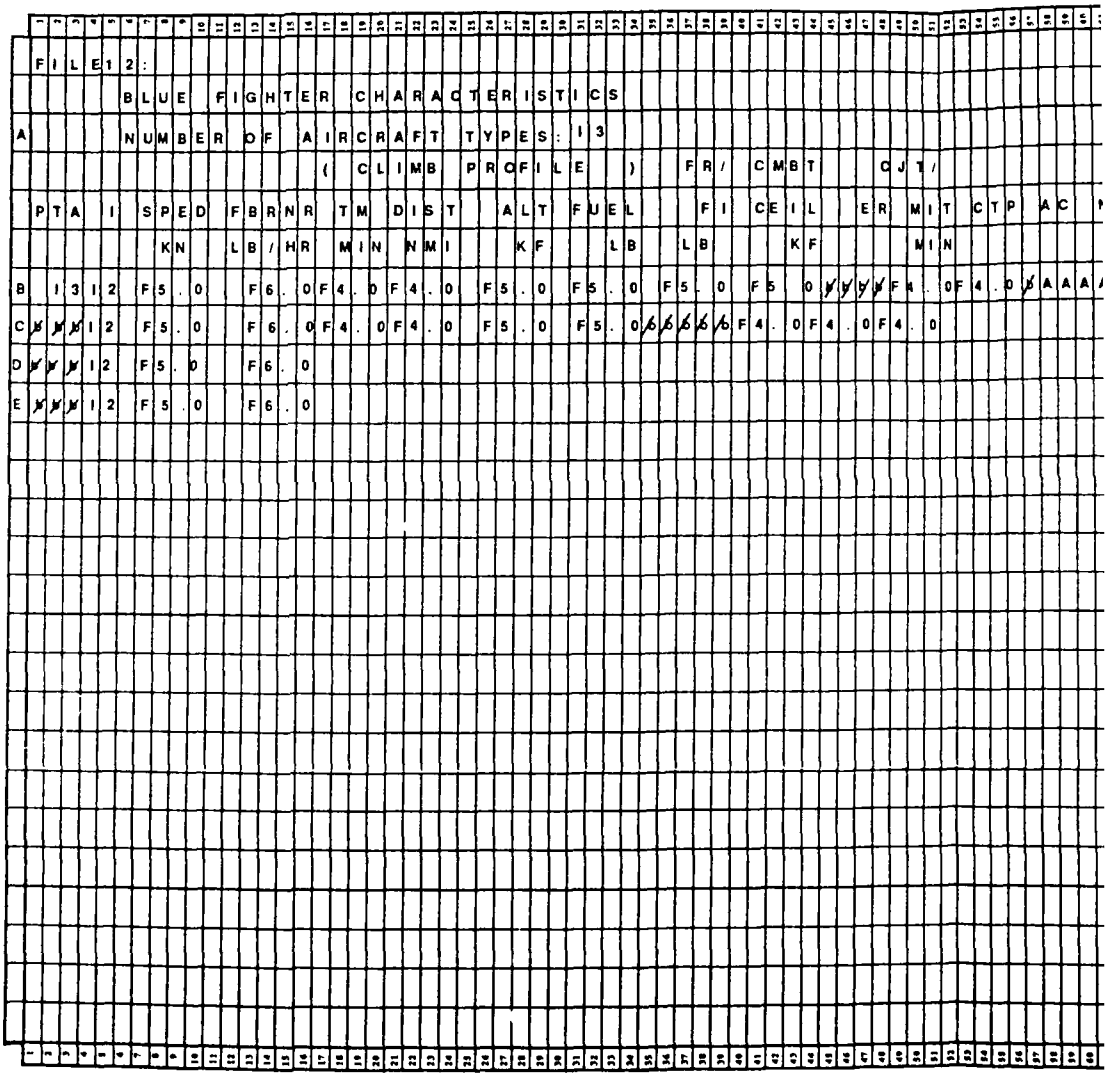

FILE12:
BLUE FIGHTER CHARACTERISTICS
A NUMBER OF AIRCRAFT TYPES: 13
(CLIMB PROFILE) FR/ CMBT CJT/
PTA I SPEED FBRNR TM DIST ALT FUEL FI CEIL ER MIT CTP AC
KN LB/HR MIN NMI KF LB LB KF MIN
B 1312 F5.0 F6.0F4.0F4.0 F5.0 F5.0 F5.0 F5.0
C 1312 F5.0 F6.0F4.0F4.0 F5.0 F5.0 F4.0F4.0F4.0
D 1312 F5.0 F6.0
E 1312 F5.0 F6.0

Figure 2.7-1

```
 FR/ CMBT   CJT/
  FI CEIL  ER MIT CTP AC NAME  ST S AT PDWN
 LB     KF      MIN
F5. 0 F5 0bbbbF4. 0F4.0bAAAAAAAA I3I2 I3F4.0
bbbbF4. 0F4. 0F4. 0
```

Figure 2.7-1

2.8 File 13 - Blue Air-Intercept Missile (AIM) Characteristics

The air intercept missile characterization: Launch Acceptable Region (LAR), definitions; minimum and maximum ranges; velocities; warhead; and, damage potential, for missiles carried by Blue fighter aircraft is specified by missile type. The file layout is included as Figure 2.8-1. Two title lines precede line image A and two column heading lines precede line image B, each composed of various lines of data. Note that values for most data elements appear only on line 1 for each missile type, while a few data elements require values on all lines. Figure 2.8-2, LAR Definition, depicts the data elements. The following is a description of the data elements in Figure 2.8-1.

TABLE 13

FILE 13 - BLUE AIM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	35-36		I2	Number of Blue missile types: (between zero and six).
FOR EACH BLUE MISSILE TYPE:				
B	1-2	MT	I2	Number (from one to six) corresponding to a particular type of air-to-air missile (dimensionless, integer). Examples: 1 - Aim-54A Phoenix; 2 - Aim-7 Sparrow; 3 - Aim-9 Sidewinder.
	3-9	RMX/RMN NMI	F7.0	Maximum effective range of the missile (nautical miles, real).
	10-16	AMX KFT	F7.0	Maximum altitude for this missile (kilofeet, real).
	17-21	SPED KN	F5.0	Average speed of the missile (knots, real).

TABLE 13 (continued)

FILE 13 - BLUE AIM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	22-23	WH	I2	Warhead type: zero for conventional warhead; integer corresponding to nuclear weapon type with characteristics specified in File 18 for nuclear warhead (dimensionless, integer).
	24-27	PK	F4.0	Probability that the missile will kill the target given launch within LAR (dimensionless, real).
	28-31	HOJ RED	F4.0	Home-on-jam reduction factor; scale factor to be applied to the clear LAR when firing at a jamming aircraft when the fighter is not tracking the target (commonly between 0.0 and 1.0, but program will accept numbers greater than 1.0)
	32-33	I	I2	Index for three target speeds to be used in defining three LARs (dimensionless, integer). Use 1 on line image B as indicated in Figure 2.8-1.
	34-38	TSPD KN	F5.0	Target speed used to define LARs (knots, real).
	39-40	J	I2	Index of altitude separation, (dimensionless, integer). Use 1 on line image B as indicated in Figure 2.8-1.
	41-44	DELZ KFT	F4.0	Altitude separation between interceptor and target (kilofeet, real).

TABLE 13 (continued)

FILE 13 - BLUE AIM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	45-50	A	F5.0	Angle, measured from the target direction of advance, for which a corresponding LAR range is specified (degrees, real).
	51-55	A	F5.0	Second such angle.
	56-60	A	F5.0	Third such angle.
	61-65	A	F5.0	Fourth such angle.
	66-70	A	F5.0	Fifth such angle.
	71-75	A	F5.0	Sixth such angle.
	76-84	NAME	2A4	Name of the missile system (used in formatting report).
C	3-9	RMX/RMN NMI	F7.0	Minimum intercept range for the missile (nautical miles, real).
	24-27	PK	F4.0	Probability that the missile will kill the target given launch within LAR in home-on-jam mode. (dimensionless, real).
	46-50	R1	F5.0	LAR range for which the corresponding angle, measured from the target direction of advance, is specified (nautical miles, real).
	51-56	R2	F5.0	Second such LAR range.

TABLE 13 (continued)

FILE 13 - BLUE AIM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	57-60	R3	F5.0	Third such LAR range.
	61-65	R4	F5.0	Fourth such LAR range.
	66-70	R5	F5.0	Fifth such LAR range.
	71-75	R6	F5.0	Sixth such LAR range.
D	39-40	J	I2	Index for three altitude separations (dimensionless, integer). Use 2 or 3 on line image D, as indicated in Figure 2.8-1.
	41-44	DELZ KFT	F4.0	Altitude separation of fighter and target (kilofeet, real).
	45-50	D	F5.0	Angle, measured from the target direction of advance for which a corresponding LAR range is specified (degree, real).
	51-55	D	F5.0	Second such angle.
	56-60	D	F5.0	Third such angle.
	61-65	D	F5.0	Fourth such angle.
	66-70	D	F5.0	Fifth such angle.
	71-75	D	F5.0	Sixth such angle.

TABLE 13 (continued)

FILE 13 - BLUE AIM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
E	32-33	I	I2	Index for three target speeds to be used in defining three LARs (dimensionless, integer). Use 2 or 3 on line image E as indicated in Figure 2.8-1.
	34-38	TSPD KN	F5.0	Target speed used to define LARs (knots, real).
	39-40	J	I2	Index for three altitude separations, Use 1 on line image E as indicated in Figure 2.8-1 (dimensionless, integer).
	41-45	DELZ KFT	F4.0	Altitude separation of fighter and target (kilofeet, real).
	46-50	NM	F5.0	Angle, measured from the target direction of advance for which a corresponding LAR range is specified. (degrees, real)
	51-55	NM	F5.0	Second such angle.
	56-60	NM	F5.0	Third such angle.
	61-65	NM	F5.0	Fourth such angle.
	66-70	NM	F5.0	Fifth such angle.
	71-75	NM	F5.0	Sixth such angle.

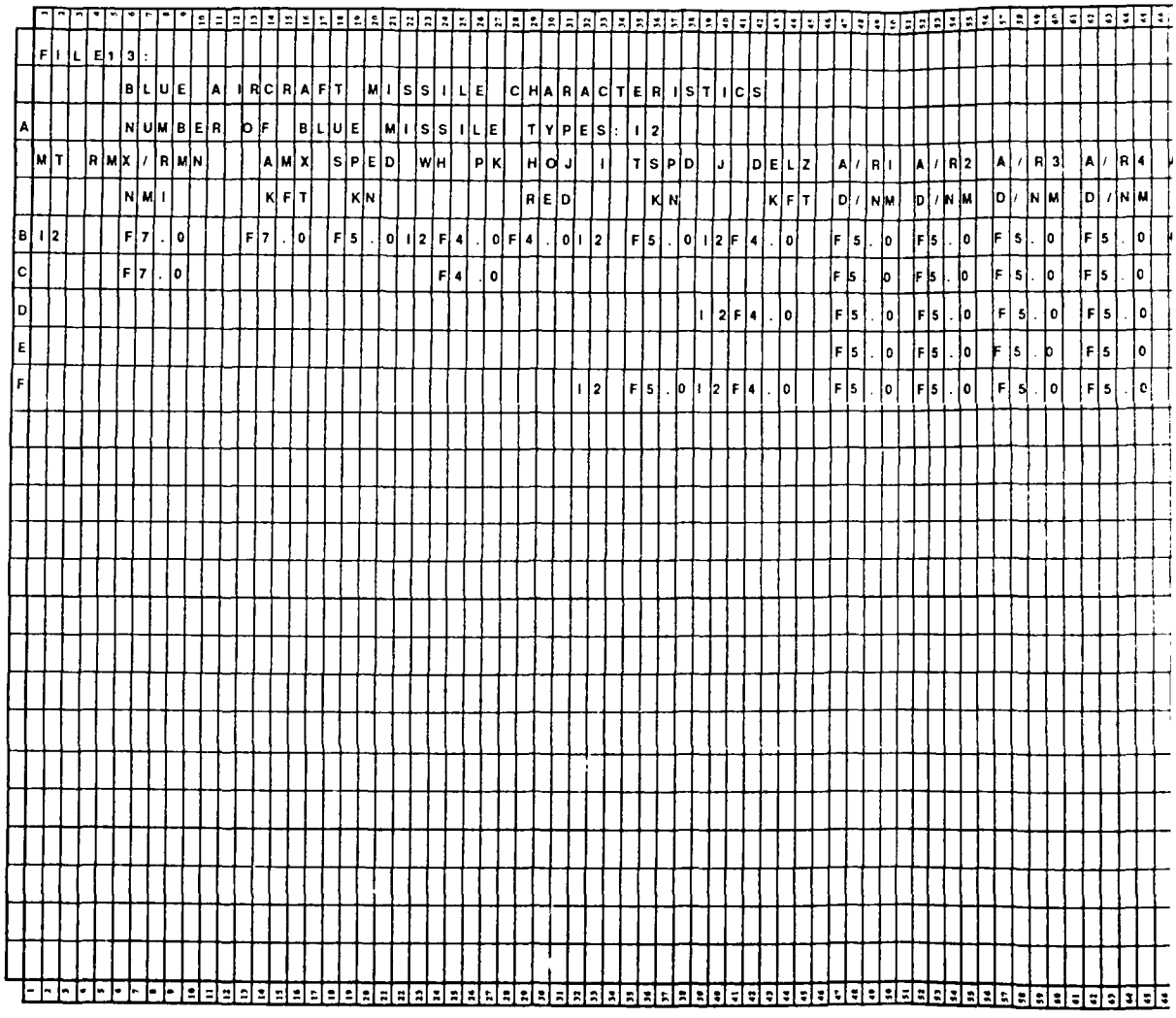

FILE13:
BLUE AIRCRAFT MISSILE CHARACTERISTICS
A NUMBER OF BLUE MISSILE TYPES: 12
MT RMX/RMN AMX SPED WH PK HOJ I TSPD J DELZ A/R1 A/R2 A/R3 A/R4
NMI KFT KN RED KN KFT D/NM D/NM D/NM D/NM
B 12 F7.0 F7.0 F5.012F4.0F4.012 F5.012F4.0 F5.0 F5.0 F5.0 F5.0
C F7.0 F4.0 F5.0 F5.0 F5.0 F5.0
D 12F4.0 F5.0 F5.0 F5.0 F5.0
E F5.0 F5.0 F5.0 F5.0
F 12 F5.012F4.0 F5.0 F5.0 F5.0 F5.0

Figure 2.8-1

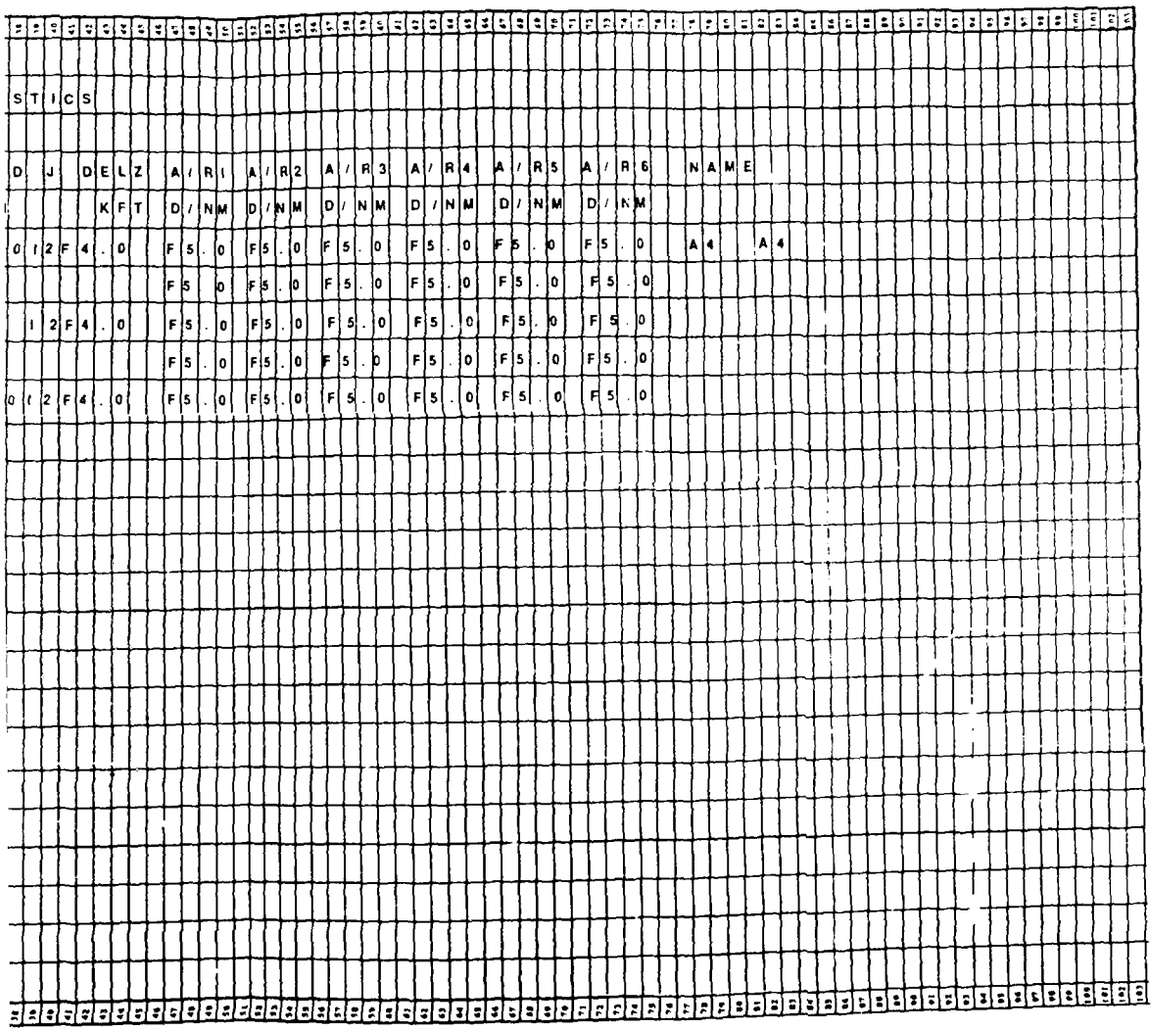

STICS
D J DELZ A/R1 A/R2 A/R3 A/R4 A/R5 A/R6 NAME
KFT D/NM D/NM D/NM D/NM D/NM D/NM
0 1 2 F4.0 F5.0 F5.0 F5.0 F5.0 F5.0 F5.0 A4 A4
F5.0 F5.0 F5.0 F5.0 F5.0 F5.0
1 2 F4.0 F5.0 F5.0 F5.0 F5.0 F5.0 F5.0
F5.0 F5.0 F5.0 F5.0 F5.0 F5.0
0 1 2 F4.0 F5.0 F5.0 F5.0 F5.0 F5.0 F5.0

Figure 2.8-1

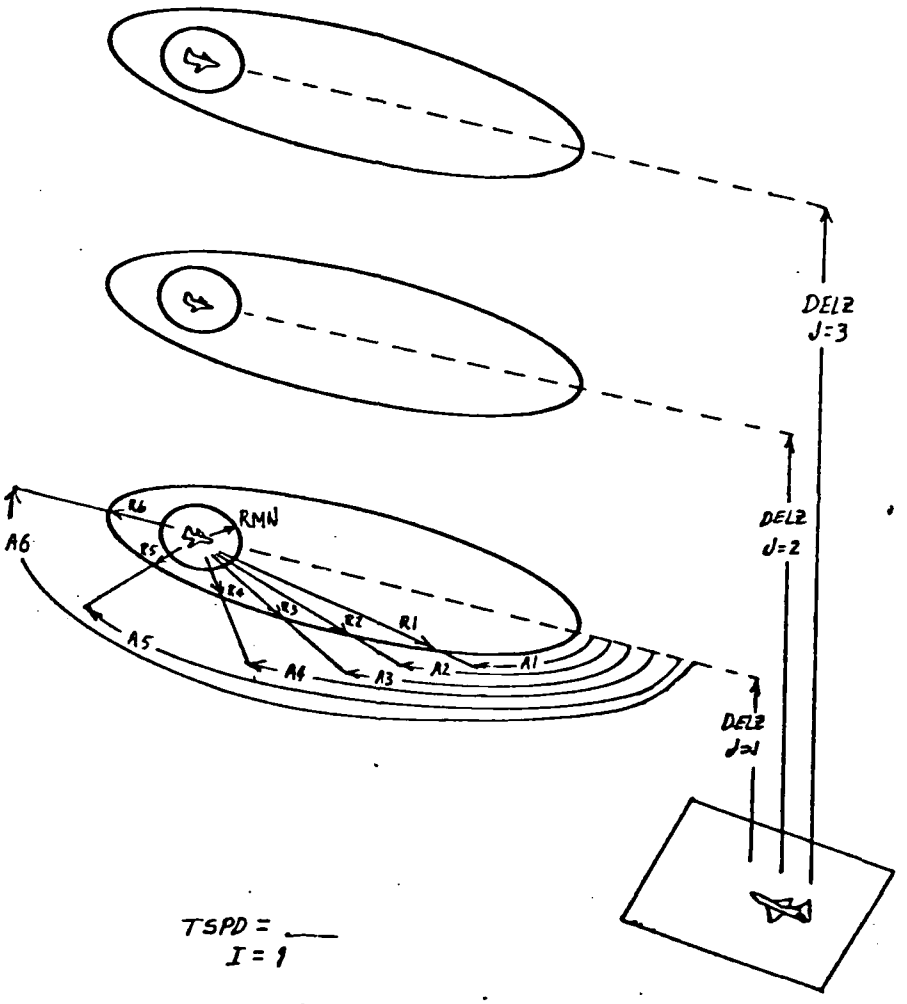


Figure 2.8-2 LAR Definition

2.9 File 14 - Blue Ship Characteristics

The Blue ship characterization: weapon inventories; sensor performance; vulnerability; and, point defense capability, is described by type. The file layout is included as Figure 2.9-1. Two title lines precede line image A and two column heading lines precede line image B, each composed of two lines of data. Note that most data elements appear only on the first line for a ship type, while a few appear on both lines. The following is a description of the data elements.

TABLE 14

FILE 14 - BLUE SHIP CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	32-34		I3	Number of Blue ship types (between zero and ten).
FOR EACH BLUE SHIP TYPE:				
B	1-3	PTS	I3	Platform type number (from one to ten) corresponding to a particular ship class or configuration (dimensionless, integer). Examples: 1 - CVN-68; 2 - CGN-38; 3 - CGN-35; 4 - CG-26; 5 - CG-16; 6 - DDG-47; 7 - DDG-10; 8 - DDG-2.
	4-5	M	I2	Index of one for conventional SAMS as indicated in Figure 2.9-1.
	6-9	MT	I4	SAM type. Integer corresponds to a SAM type with characteristics specified in File 15; only one conventional SAM type per ship (dimensionless, integer).

TABLE 14 (continued)

FILE 14 - BLUE SHIP CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	10-13	NL	I4	Number of SAM launchers (dimensionless, integer).
	14-18	CPA NMI	F5.0	Hot Closest Point of Approach, cross range inside of which incoming missile is considered threat to own ship (nautical miles, real).
	19-21	ST	I3	Sensor type of primary search radar (dimensionless, integer). Must correspond to a search radar with characteristics specified in File 11. Example values: 3 - SPY-1; 4 - SPS-40; 5 - SPS-48.
	22-25	AT	I4	Automatic detect and track capacity (dimensionless, integer).
	26-27	S	I2	Data system: 1 - has TDS; 0 - does not have TDS. (dimensionless, integer)
	28-30	HT	I3	Number of hits by conventional warheads on ship to cause fifty percent weapon delivery impairment (dimensionless, integer).
	31-34	DPD	F4.0	Distance from target ship to antiship missile at which the ship's point defense is initiated; must not be zero (for no point defense capability, put zeros in next field, PKP) (nautical miles, real).

TABLE 14 (continued)

FILE 14 - BLUE SHIP CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	35-38	PKP	F4.0	Probability of kill for point defense against low altitude missiles (below 1000 meters) includes both hard and soft kills (dimensionless, real).
	39-42	CM	F4.0	Fraction of point defense kills attributable to ECM, soft kill (dimensionless, integer).
	43-44	C	I2	Flag indicating ship is eligible to serve as a command center; aircraft carriers or cruisers ship are generally eligible. (dimensionless, integer).
	45-47	AC	I3	Maximum number of fighter aircraft that can be assigned to this ship for control (VF, integer).
	48-50	VC	I3	Maximum number of fighter aircraft that can be vectored toward intercept by this ship (VF, integer).
	51-56	SENSR	F6.0	Initial sensor height (feet).
	57-60	FCS	I4	Type of fire control system, integer corresponds to a fire control system type with characteristics specified in File 10 (dimensionless, integer).
	61-64	JTP	I4	Jammer type, integer which corresponds to a jammer type with characteristics specified in File 28 (dimensionless, integer).
	65-68	NMJ	I4	Jammer number, corresponding to a jammer type.

TABLE 14 (continued)

FILE 14 - BLUE SHIP CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	69-72	RAD	F4.0	Radar cross-section of Blue ship (square meters, real).
C	4-5	M	I2	Index of 2 for nuclear SAMs, as indicated in Figure 2.9-1.
	6-9	MT	I4	SAM type integer; corresponds to a SAM type with characteristics specified in File 15. One nuclear SAM type per ship (dimensionless, integer).
	10-13	LT	I4	SAM launcher type (dimensionless, integer). Points to launcher type number in File 08, which in turn points to the class corresponding to a particular type of launcher: 1 - single rail; 2 - duel rail; 3 - vertical.
	14-21	ST	I8	Sensor type of secondary search radar (dimensionless, integer).
	22-30	HT	I9	Number of hits on ship by nuclear warheads that result in 100 percent weapon delivery impairment (dimensionless, integer).
	31-38	PKP	F8.0	PK of point defense against high altitude missiles (1000 meters) includes both hard and soft kills (dimensionless, real).

TABLE 14 (continued)

FILE 14 - BLUE SHIP CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	61-64	JTP	I4	Jammer type, integer which corresponds to a jammer type with characteristics specified in File 28 (dimensionless, integer).
	65-68	NMJ	I4	Jammer number, corresponding to a jammer type.

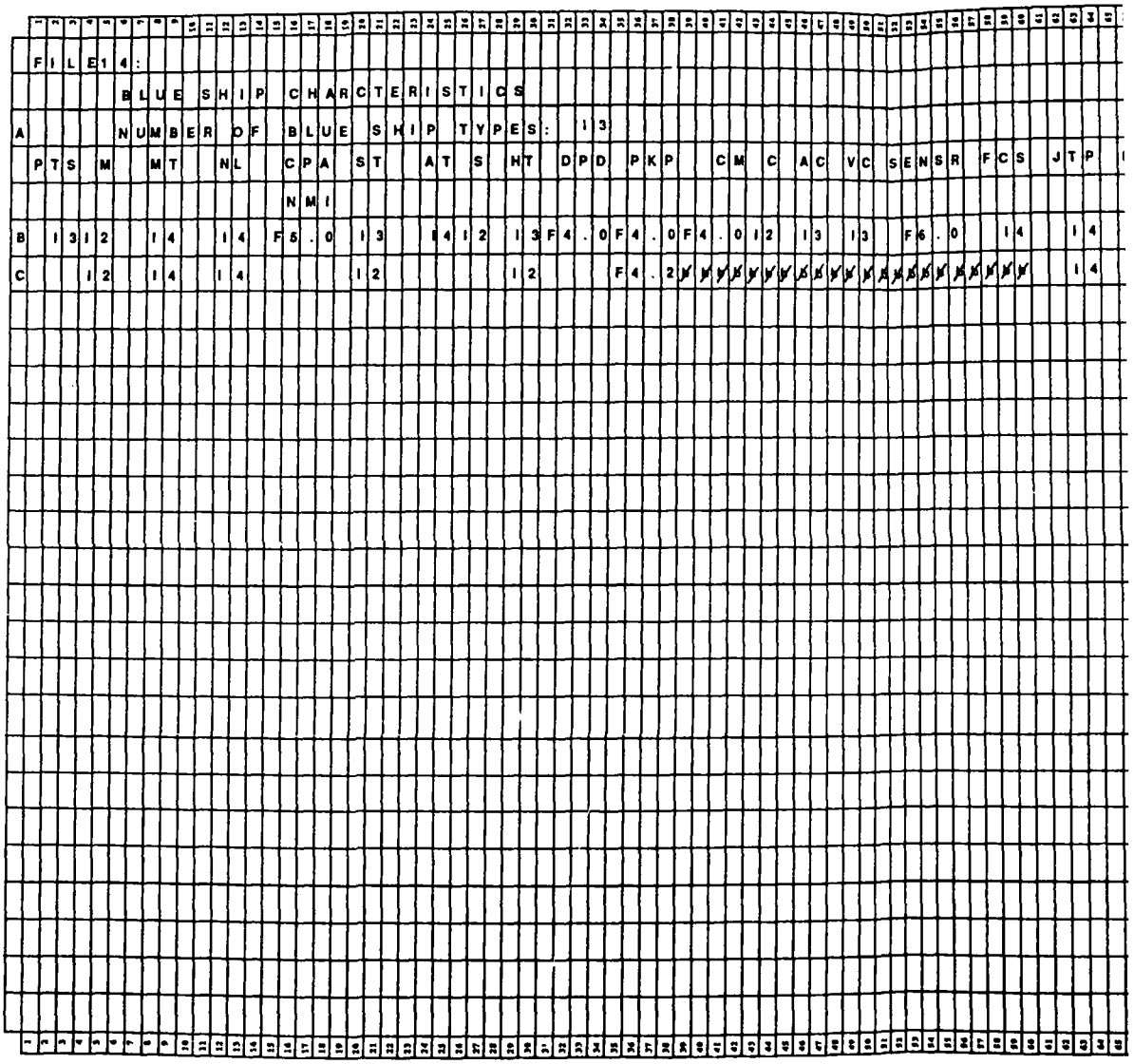

FILE14:
BLUE SHIP CHARCTERISTICS
A NUMBER OF BLUE SHIP TYPES: 13
PTS M MT NL CPA ST AT S HT DPD PKP CM C AC VC SENSR FCS JTP
NMI
B 13I2 I4 I4 F5.0 I3 I4I2 I3F4.0F4.0F4.0I2 I3 I3 F6.0 I4 I4
C I2 I4 I4 I2 I2 F4.2 I4

Figure 2.9-1

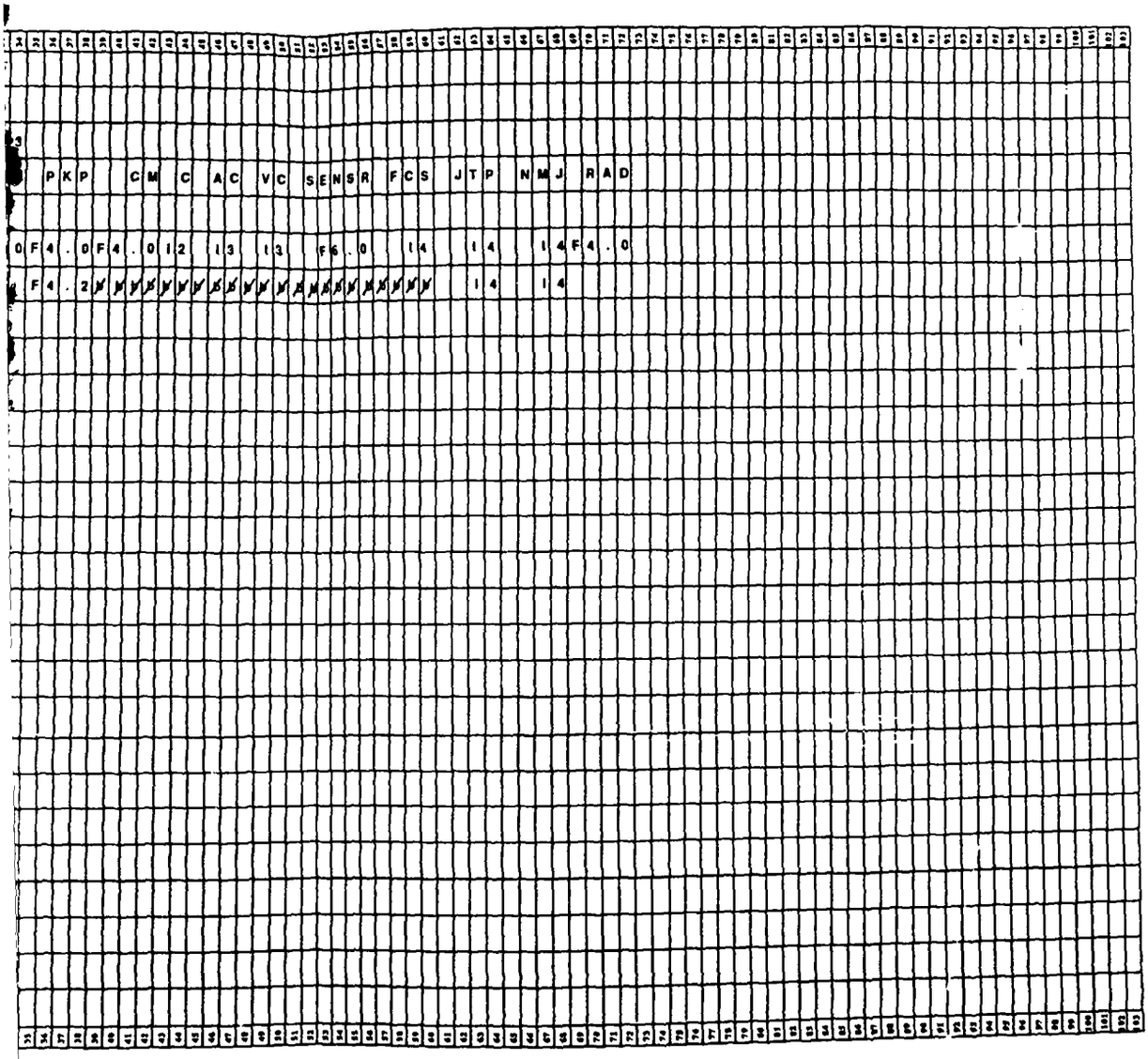

PKP CM C AC VC SENSR FCS JTP NMJ RAD
0F4.0F4.0 I2 I3 I3 F6.0 I4 I4 I4F4.0
F4.2 I4 I4

Figure 2.9-1

2.10 File 15 - Blue Surface-to-Air Missiles (SAM) Characteristics

The surface-to-air missiles system characterization: kinematic envelope for intercept; velocity; guidance type, command-all-the-way, home-all-the-way, or mid-course guidance with terminal homing; warhead; kill probabilities based on time of flight; and, effect of target dive maneuvers is specified by type for aircraft and each RED missile. The file layout is included as Figure 2.10-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of SAM system descriptions, each composed of three or more lines of data, in multiples of three. Note that some data elements appear only on line 1, some on the first of each set of three lines, and others on every line. The following is a description of the data elements.

TABLE 15

FILE 15 - BLUE SAM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	26-28		I3	Number of SAM types: (between zero and ten).
FOR EACH SAM TYPE:				
B	1-3	MTY	I3	Number (from 1 to 10) corresponding to a particular SAM type (dimensionless, integer). Example values: 1 - RIM-1; 2 - RIM-2; 3 - RIM-3; 4 - RIM-4; 5 - RIM-5;.

TABLE 15 (continued)

FILE 15 - BLUE SAM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	4-7	SEK TYP		Seeker type; currently not implemented.
	8-12	GTY	I5	SAM guidance/illuminator type: 1 - command-all-the-way; 2 - home-all-the-way; 3 - mid-course guidance. (dimensionless, integer).
	13-15	WH	I3	Warhead type, use 0 for conventional and integer which corresponds to a nuclear weapon with characteristics specified in File 18 for nuclear warheads. (dimensionless, integer).
	16-21	CEIL KFT	F6.0	Maximum altitude for engagement (kilofeet, real).
	22-25	NTT	I4	Number of target types (dimensionless, integer). Equal to the number of SAM envelopes defined for this particular SAM type.
FOR EACH SAM ENVELOPE:				
	26-28	TT	I3	Red target type to which the envelope applies; integer corresponding to missile type with characteristics specified in File 17. (dimensionless, integer). Examples: 1 - Kitchen; 2 - Kelt; 3 - SS-N-7; 4 - SS-N-10· 11 - Aircraft.

TABLE 15 (continued)

FILE 15 - BLUE SAM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	29-32	MXC NMI	F4.0	Maximum cross range (nautical miles, real). See Figure 2.10-2.
	33-36	MNC NMI	F4.0	Minimum cross range (nautical miles, real). See Figure 2.10-2.
	37-40	MNR NMI	F4.0	Minimum range (nautical miles, real). See Figure 2.10-2.
	41-45	EVA NMI	F5.0	A-coefficient (cross range) for superellipse (nautical miles, real). See Figure 2.10-2.
	46-50	EVB NMI	F5.0	B-coefficient (down range) for super ellipse (nautical miles, real). See Figure 2.10-2.
	51-54	EVN	F4.0	Exponent for super ellipse (dimensionless, real). See Figure 2.10-2.
PROBABILITY OF HIT TABLE FOR SAM ENVELOPE (SEE FIGURE 2.10-3):				
	55-58	TOF MIN	F4.0	First value for SAM time of flight (minutes, real).
	59-62	PK	F4.0	SAM probability of hit as a function of the specified first value for SAM time of flight (dimensionless, real).
	63-67	VELC KN	F5.0	Nominal speed (knots, real).
	68-71	TGP MIN	F4.0	Length of time in gap (minutes, real).

TABLE 15 (continued)

FILE 15 - BLUE SAM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	72-76	PGP	F5.0	Probability of hit in gap (dimensionless, real).
C	55-58	TOF MIN	F4.0	Second and third values for SAM time of flight (minutes, real).
	59-62	PK	F4.0	Second and third SAM hit probabilities each as a function of the corresponding second and third values for SAM time of flight (dimensionless, real).
D	26-28	TT	I3	Red target type to which the envelope applies; integer corresponding to missile type with characteristics specified in File 17 (dimensionless, integer). Example 1 - Kitchen; 2 - Kelt; 3 - SS-N-7; 4 - SS-N-10; 11 - Aircraft.
	29-32	MXC NMI	F4.0	Maximum cross range (nautical miles, real). See Figure 2.10-2.
	33-36	MNC NMI	F4.0	Minimum cross range (nautical miles, real). See Figure 2.10-2.
	37-40	MNR NMI	F4.0	Minimum range (nautical miles, real). See Figure 2.10-2.

TABLE 15 (continued)

FILE 15 - BLUE SAM CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
D (cont)	41-45	EVA NMI	F5.0	A-coefficient (cross range) for super ellipse (nautical miles, real). See Figure 2.10-2.
	46-50	EVB NMI	F5.0	B-coefficient (down range) for super ellipse (nautical miles, real). See Figure 2.10-2.
	51-54	EVN	F4.0	Exponent for super ellipse (dimensionless, real). See Figure 2.10-2.
	55-58	TOF MIN	F4.0	First value in probability of hit table for SAM time of flight (minutes, real).
	59-62	PK	F4.0	SAM probability of hit as a function of the specified first value for SAM time of flight (dimensionless, real).
	63-67	VELC KN	F5.0	Nominal speed (knots, real).
	68-71	TGP MIN	F4.0	Length of time in gap (minutes, real).
	72-76	PGP	F5.0	Probability of hit in gap (dimensionless,real).

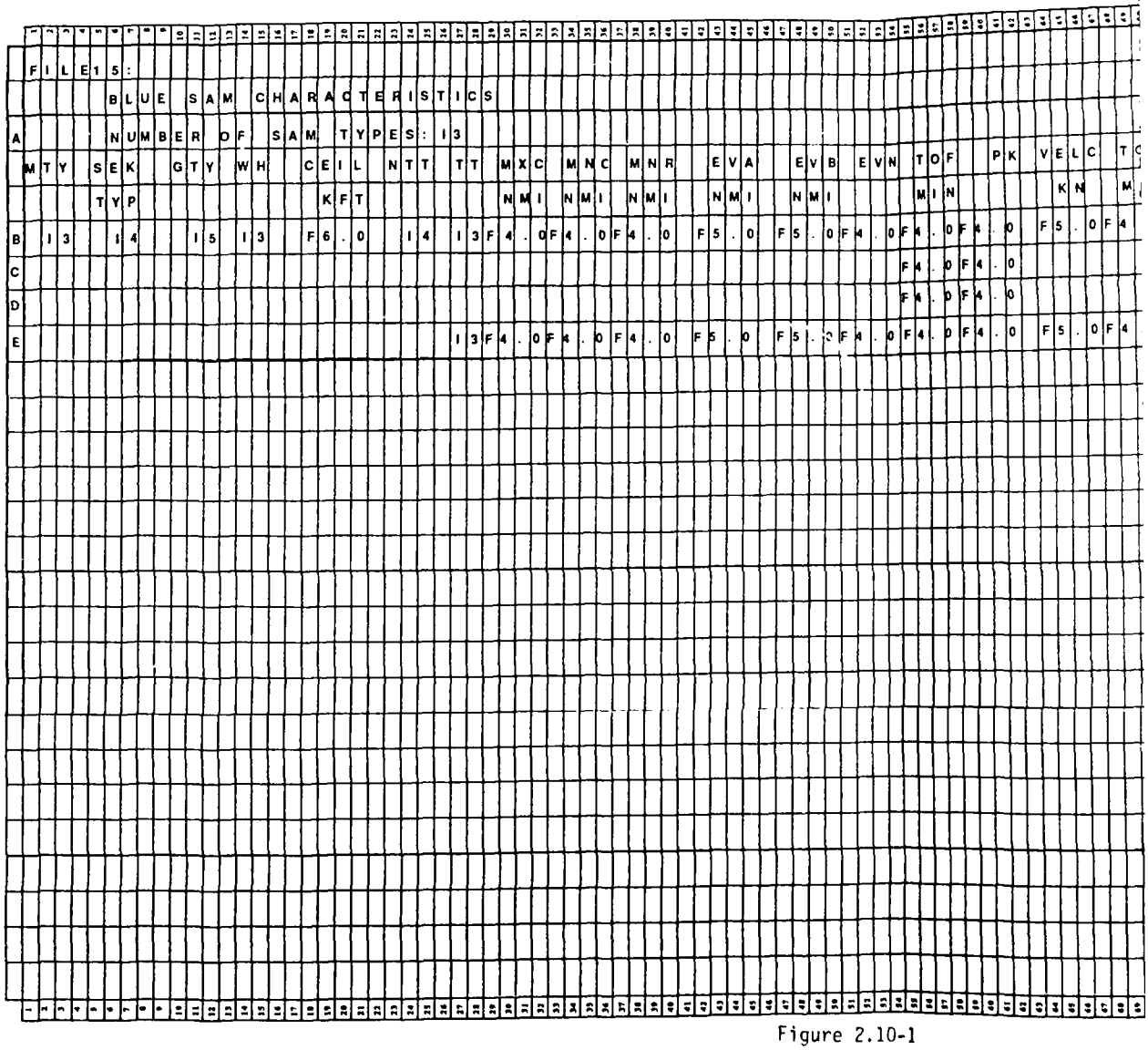

FILE15:
BLUE SAM CHARACTERISTICS
A NUMBER OF SAM TYPES: 13
MTY SEK GTY WH CEIL NTT TT MXC MNC MNR EVA EVB EVN TOF PK VELC
TYP KFT NMI NMI NMI NMI NMI MIN KN
B 13 14 15 13 F6.0 14 13F4.0F4.0F4.0 F5.0 F5.0F4.0F4.0F4.0 F5.0F4
C F4.0F4.0
D F4.0F4.0
E 13F4.0F4.0F4.0 F5.0 F5.0F4.0F4.0F4.0 F5.0F4

Figure 2.10-1

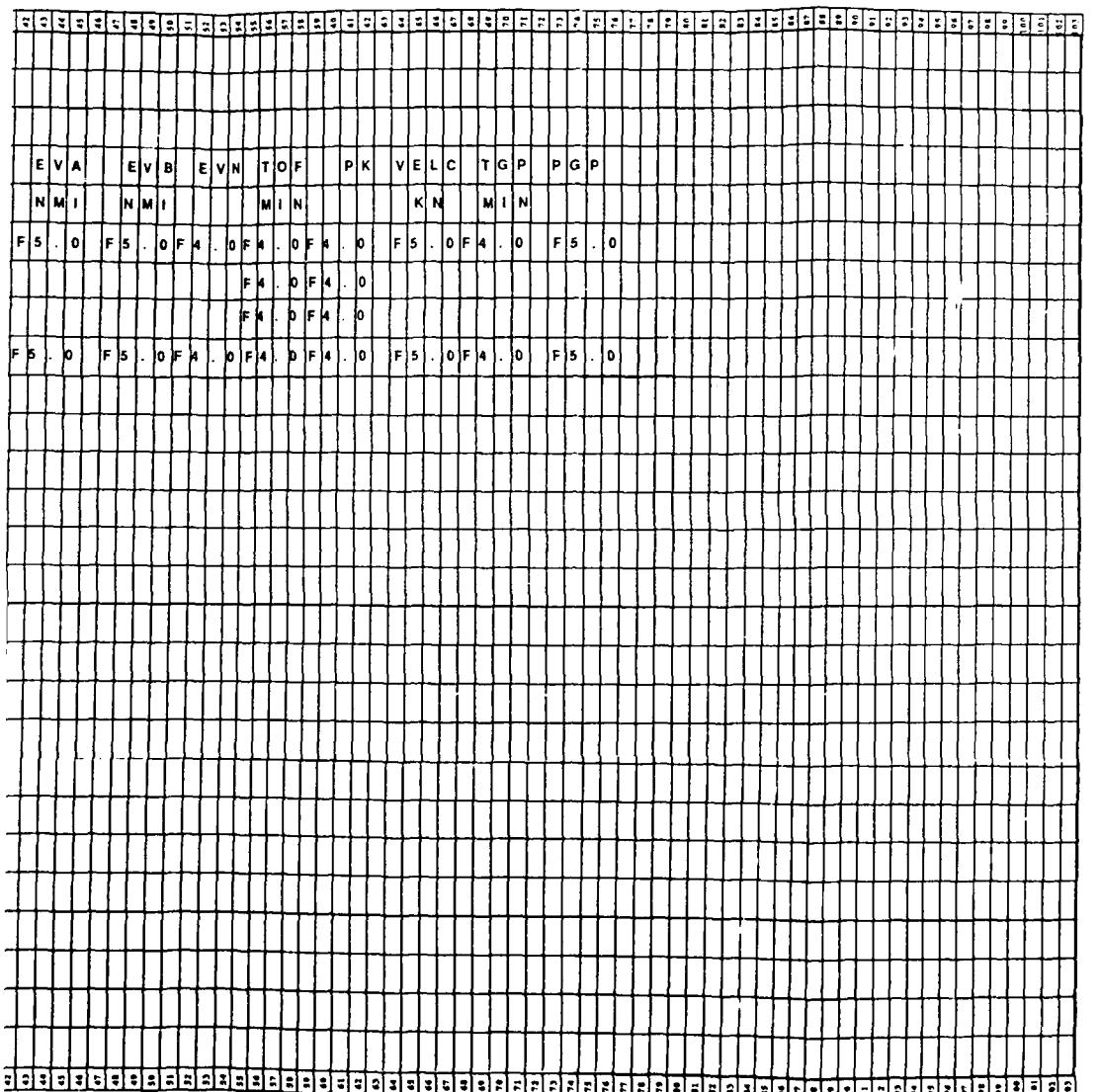
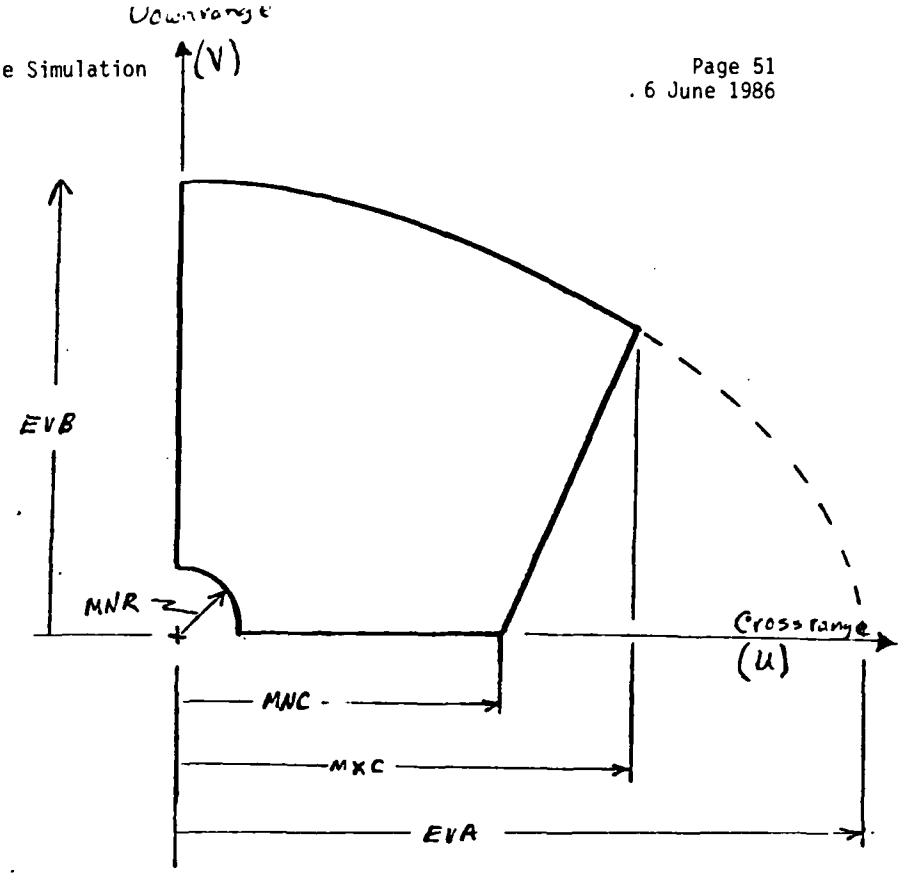

EVA EVB EVN TOF PK VELC TGP PGP
NMI NMI MIN KN MIN
F5.0 F5.0F4.0F4.0F4.0 F5.0F4.0 F5.0
F4.0F4.0
F4.0F4.0
F5.0 F5.0F4.0F4.0F4.0 F5.0F4.0 F5.0

Figure 2.10-1



$$\left(\frac{U}{EVA}\right)^{EVN} + \left(\frac{V}{EVB}\right)^{EVN} = 1$$

Figure 2.10-2 SAM Enevelope Definitions

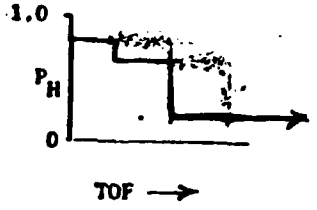


Figure 2.10-3 Probability of Hit Function

2.11 File 16 - Red Aircraft Characteristics

The Red aircraft characterization: radar cross-section; radar jammer numbers and types; numbers and types of anti-ship missiles; primary sensor carried; and navigation error parameters is specified by type. The file layout is included as Figure 2.11-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines representing different platform types. The following is a description of the data elements.

TABLE 16

FILE 16 - RED AIRCRAFT CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	35-37		I3	Number of Red aircraft types (between zero and twenty).
FOR EACH RED AIRCRAFT TYPE:				
B	1-2	PT	I2	Platform type number (from 1 to 20) corresponding to a particular model or configuration of Red aircraft (dimensionless, integer). Examples: 1 - Backfire; 2 - Blinder; 3 - Bear; 4 - Foxbat.
	3-6	RXS DbM BAND C	F4.0	Radar cross-section of Red aircraft in the frequency band 0.5 to 1.0 GHz (decibels relative to 1 square meter, real)
	7-10	RXS DbM BAND E/F	F4.0	Radar cross-section of Red aircraft in the frequency band 2 to 4 GHz (decibels relative to 1 square meter, real)

TABLE 16 (continued)

FILE 16 - RED AIRCRAFT CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	11-14	RXS DbM BAND I/J	F4.0	Radar cross-section of Red aircraft in the frequency band 8 to 17 GHz (decibels relative to 1 square meter, real)
	15-18	RXS DbM BAND K	F4.0	Radar cross-section of Red aircraft in the frequency band 27 to 40 GHz (decibels relative to 1 square meter, real)
	19-21	J1	I3	Type designation of first of up to twelve jammers onboard the Red aircraft. Must correspond to a JT value in File 27, Red Jammer Characteristics (dimensionless, integer).
	22-24	J2	I3	Type designation of second such jammer (dimensionless, integer).
	25-27	J3	I3	Type designation of third such jammer (dimensionless, integer).
	28-30	J4	I3	Type designation of fourth such jammer (dimensionless, integer).
	31-33	J5	I3	Type designation of fifth such jammer (dimensionless, integer).
	34-36	J6	I3	Type designation of sixth such jammer (dimensionless, integer).
	37-39	J7	I3	Type designation of seventh such jammer (dimensionless, integer).
	40-42	J8	I3	Type designation of eighth such jammer (dimensionless, integer).
	43-45	J9	I3	Type designation of ninth such jammer (dimensionless, integer).

TABLE 16 (continued)

FILE 16 - RED AIRCRAFT CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	46-48	JA	I3	Type designation of tenth such jammer (dimensionless, integer).
	49-51	JB	I3	Type designation of eleventh such jammer (dimensionless, integer).
	52-54	JC	I3	Type designation of twelfth such jammer (dimensionless, integer).
	55-57	DB SEC	I3	Delay between consecutive missile launches (seconds, integer).
	59-61	DL SEC	I3	Delay after last missile launch before Red aircraft can depart (seconds, integer).
	62-64	MC	I3	Number of missiles carried (missiles, integer).
	65-67	MT1	I3	Type designation of first of up to four missiles to be launched by the Red aircraft. Must correspond to a MT value in File 17 (dimensionless, integer). Examples: 1 - Kitchen; 2 - Kelt.
	68-61	MT2	I4	Type designation of second such missile to be launched by the Red aircraft (dimensionless, integer).
	72-75	MT3	I4	Type designation of third such missile to be launched by the Red aircraft (dimensionless, integer).

TABLE 16 (continued)

FILE 16 - RED AIRCRAFT CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	76-79	MT4	I4	Type designation of fourth such missile to be launched by the Red aircraft (dimensionless, integer).
	80-83	RSN	I4	Red sensor number, integer which corresponds to a Red sensor type with characteristics defined in File 31 (dimensionless, integer).
	85-94	AIRCRAFT NAME	A10	Aircraft name (up to 10 characters).
NOTE: The following columns are headed by "NAVIAGATION ERROR" "TYPE1 TYPE2"				
	96-102	HEAD	F7.2	Navigation error, type 1, heading deviation (degrees, real).
	103-109	SPEED	F7.2	Navigation error, type 1, speed deviation (knots, real).
	110-116	DRIFT	F7.2	Navigation error, type 2, average drift rate (knots, real).

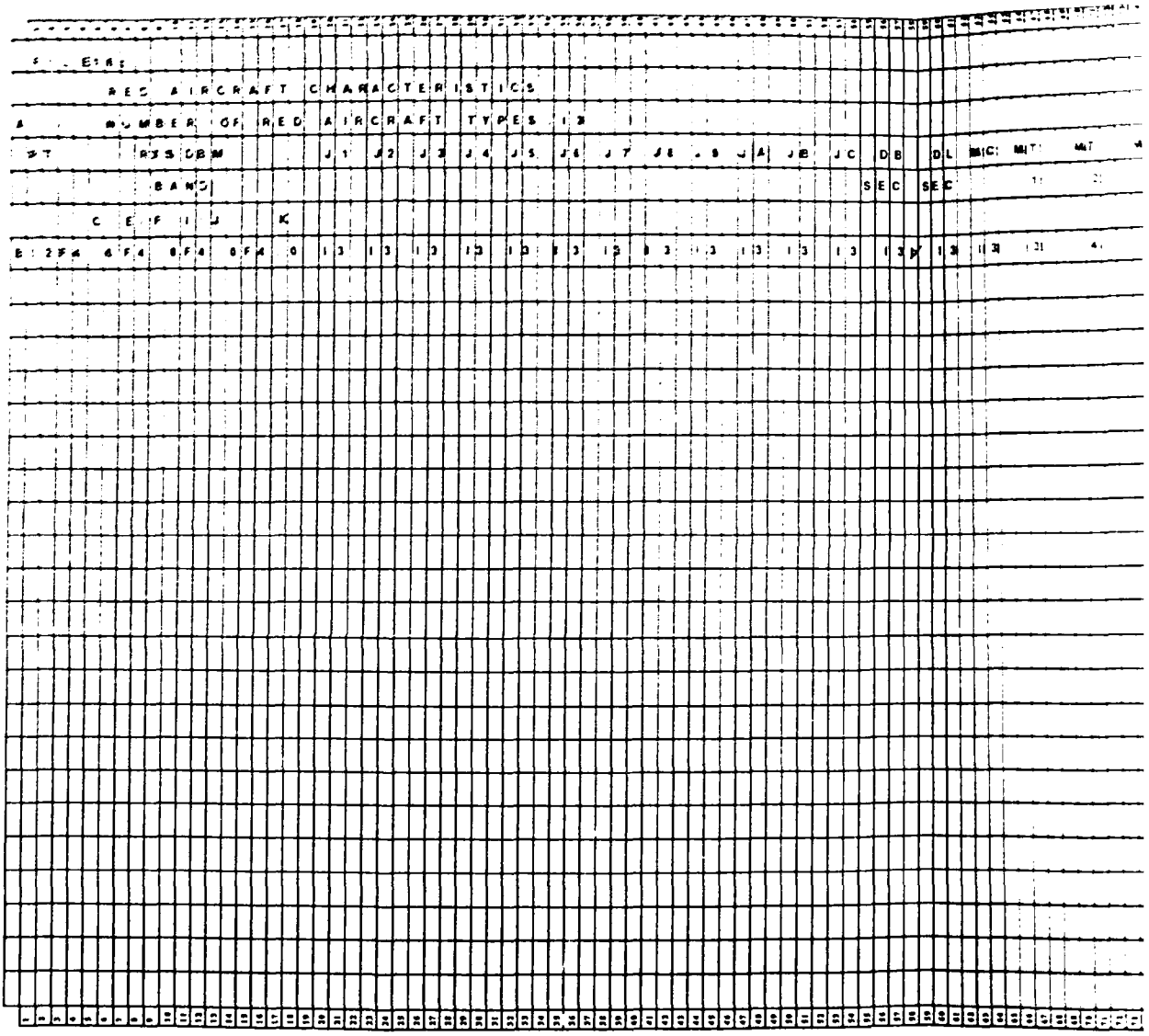

RED AIRCRAFT CHARACTERISTICS
NUMBER OF RED AIRCRAFT TYPES
BAND
SEC
SEC

Figure 2.11-1

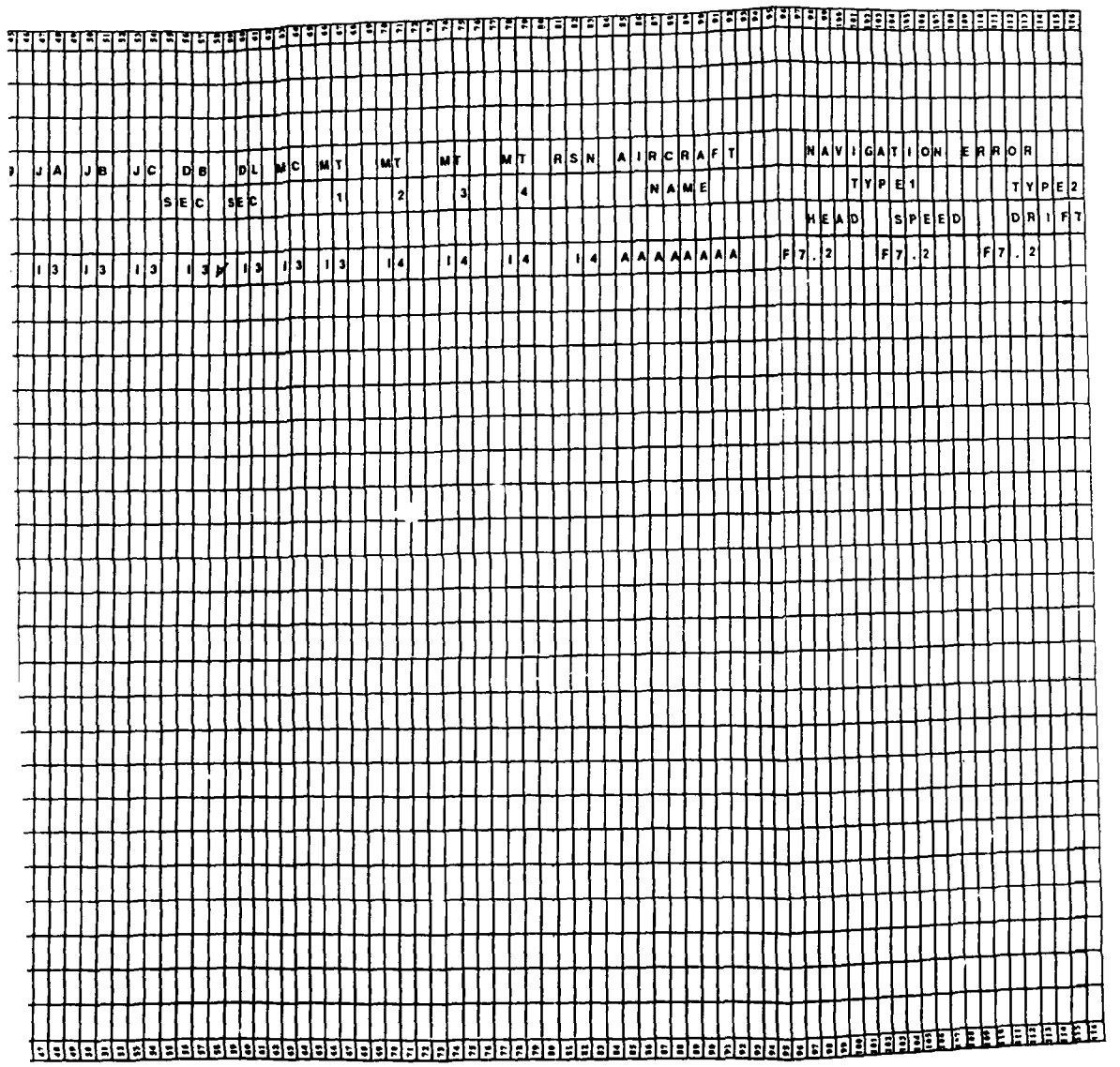

JA JB JC DB DL MC MT MT MT MT RSN AIRCRAFT NAVIGATION ERROR
SEC SEC 1 2 3 4 NAME TYPE 1 TYPE 2
HEAD SPEED DRIFT
I3 I3 I3 I3 I3 I3 I3 I4 I4 I4 I4 AAAAAAAA F7.2 F7.2 F7.2

Figure 2.11-1

2.12 File 17 - Red Anti Ship Missile (ASM) Characteristics

The anti-ship cruise missile characterization: radar cross-section; maximum range; minimum range; flight characteristics, speed, altitude and distance, for up to five phases of flight; warhead and arming data; reliability data; and, fuse and warhead conditional kill probabilities for Red missiles are specified by missile type. The file layout is included as Figure 2.12-1. Two title lines precede line image A and four column heading lines precede line image B. The file contains a variable number of data lines representing different missile types. The following is a description of the data elements.

TABLE 17

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	34-36		I3	Number of Red missile types (between zero and ten).
FOR EACH RED MISSILE TYPE:				
B	1-2	MT	I2	Number (from 1 to 10) which corresponds to particular type of Red anti-ship missile (dimensionless, integer).
	3-7	RMX NMI	F5.0	Maximum range of missile (nautical miles, real).
	8-11	RMN NMI	F4.0	Minimum range of missile (nautical miles, real).
	12-16	CLMB NMI	F5.0	Downrange distance associated with launch climb/dive phase (See Figure 2.12-2) (nautical miles, real).
	17-21	CRSA KF	F5.0	Altitude of cruise phase A. (See Figure 2.12-2) (kilofeet,real)

TABLE 17 (continued)

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	22-26	IDIV NMI	F5.0	Downrange distance associated with dive/climb between cruise phases A and B (See Figure 2.12-2) (nautical miles, real).
	27-31	CRSB KF	F5.0	Altitude of cruise phase B (See Figure 2.12-2) (kilofeet,real).
	32-36	TDIV NMI	F5.0	Downrange distance associated with dive/climb on target. (See Figure 2.12-2) (nautical miles,real)
	37-41	RNG NMI	F5.0	Maximum downrange distance for pullout from dive/climb between cruise phases A and B. (See Figure 2.12-2) (nautical miles, real).

NOTE: The following columns dealing with radar cross-section are all headed by "RCS(HI/ LOW)"
"DbM / DbM"
"BAND"

	43-46	BAND C	F4.0	Radar cross-section of Red missile during high-altitude cruise, climb and dive phases in the frequency band 0.5 to 1.0 GHz (decibels relative to one square meter, real)
	47-50	BAND E/F	F4.0	Radar cross-section of Red missile during high-altitude cruise, climb and dive phases in the frequency band two to four GHz (decibels relative to one square meter, real)

TABLE 17 (continued)

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	51-54	BAND I/J	F4.0	Radar cross-section of Red missile during high-altitude cruise, climb and dive phases in the frequency band eight to 17 GHz (decibels relative to one square meter, real)
	55-58	BAND K	F4.0	Radar cross-section of Red missile during high-altitude cruise, climb and dive phases in the frequency band 27 to 40 GHz (decibels relative to one square meter, real)
	59-61	WH	I3	Warhead type: use 0 for conventional warhead; integer which corresponds to a nuclear weapon type with characteristics specified in File 18 for nuclear warheads (dimensionless, integer).

NOTE: The following columns dealing with warhead arming are all headed by "ARMING"

62-63	I	I2	Missile arming indicator (dimensionless, integer from 1 to 8). Specifies time/place for arming as follows: 1 - Time offset from launch (minutes, real); 2 - Time offset from start of cruise phase A (minutes, real); 3 - Time offset from start of dive/climb between cruise phases A and B (minutes, real); 4 - Time offset from start of cruise phase B (minutes, real);

TABLE 17 (continued)

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)				5 - Time offset from start of dive/climb on target (minutes, real); 6 - Time offset from burst on target (minutes, real); 7 - Distance downrange from launch (nautical miles, real); 8 - Distance downrange prior to target (nautical miles, real).
	64-68	D/TM NMI/ MIN	F5.0	Missile arming parameter (minutes or nautical miles, real).

NOTE: The following columns dealing with missile reliability are all headed by "---MTTF__"

69-73	FLT MIN	F5.0	Mean time to mechanical failure associated with missile flight assumed to follow an exponential distribution from time of launch. (minutes, real).
74-78	SURF MIN	F5.0	Mean time to clobber, failure by collision with the surface, associated with low altitude portion of missile flight, assumed to follow an exponential distribution after low altitude cruise begins (minutes, real).
79-82	PDD	F4.0	Probability that the missile will be a dud, launch abort (dimensionless, real).
83-86	PSF	F4.0	Probability of salvage fuse firing if hit by SAM or point defenses; zero if salvage fuse firing is not possible or if conventional warhead (dimensionless, real).

TABLE 17 (continued)

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	87-90	PWH	F4.0	Probability that nuclear warhead or fuse is killed if hit by conventional SAM or point defenses, given that the missile airframe incurred a hard kill without the salvage fuse functioning (dimensionless, real).
C	12-16	D/V KN	F5.0	Launch climb/dive velocity (see Figure 2.12-2) (knots, real).
	17-21	H/V KN	F5.0	Velocity of cruise phase A (see Figure 2.12-2) (knots, real).
	22-26	D/V KN	F5.0	Velocity of dive/climb between cruise phases A and B (see Figure 2.12-2) (knots, real).
	27-31	H/V KN	F5.0	Velocity of cruise phase B (See Figure 2.12-2) (knots, real).
	32-36	D/V KN	F5.0	Velocity of dive/climb on target (see Figure 2.12-2) (knots,real).
	37-41	HOB FT	F5.0	Height of burst (feet, real).

TABLE 17 (continued)

FILE 17 - RED ANTISHIP MISSILE CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
NOTE: The following columns dealing with radar cross-section are all headed by "RCS(HI/ LOW)" "DbM / DbM" "BAND"				
C (cont)	43-46	BAND C	F4.0	Radar cross-section of Red missile during low-altitude cruise, climb and dive phases in the frequency band 0.5 to 1.0 GHz (decibels relative to one square meter, real)
	47-50	BAND E/F	F4.0	Radar cross-section of Red missile during low-altitude cruise, climb and dive phases in the frequency band two to four GHz (decibels relative to one square meter, real)
	51-54	BAND I/J	F4.0	Radar cross-section of Red missile during low-altitude cruise, climb and dive phases in the frequency band eight to 17 GHz (decibels relative to one square meter, real)
	55-58	BAND K	F4.0	Radar cross-section of Red missile during low-altitude cruise, climb and dive phases in the frequency band 27 to 40 GHz (decibels relative to one square meter, real)

Figure 2.12-3, ASM Profile Worksheet may be helpful in characterizing anti-ship cruise missile trajectories.

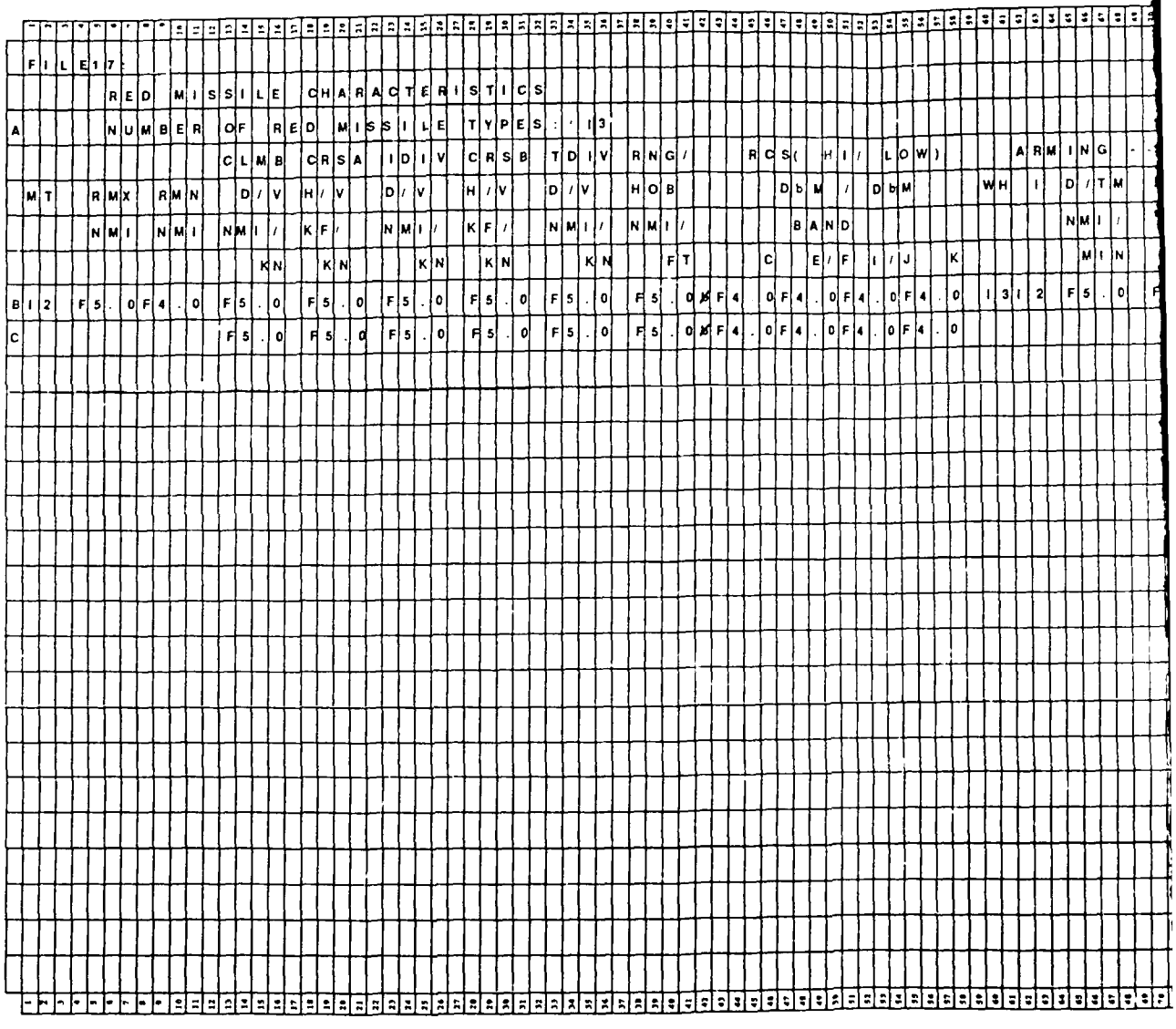

FILE17:
RED MISSILE CHARACTERISTICS
A NUMBER OF RED MISSILE TYPES: 13
CLMB CRSA IDIV CRSB TDIV RNG/ RCS(HI/ LOW) ARMING -
MT RMX RMN D/V H/V D/V H/V D/V HOB DbM / DbM WH I D/TM
NMI NMI NMI/ KF/ NMI/ KF/ NMI/ NMI/ BAND NMI/
KN KN KN KN KN FT C E/F I/J K MIN
B12 F5.0F4.0 F5.0 F5.0 F5.0 F5.0 F5.0 F5.0F4.0F4.0F4.0F4.0 1312 F5.0 F
C F5.0 F5.0 F5.0 F5.0 F5.0 F5.0F4.0F4.0F4.0F4.0

Figure 2.12-1

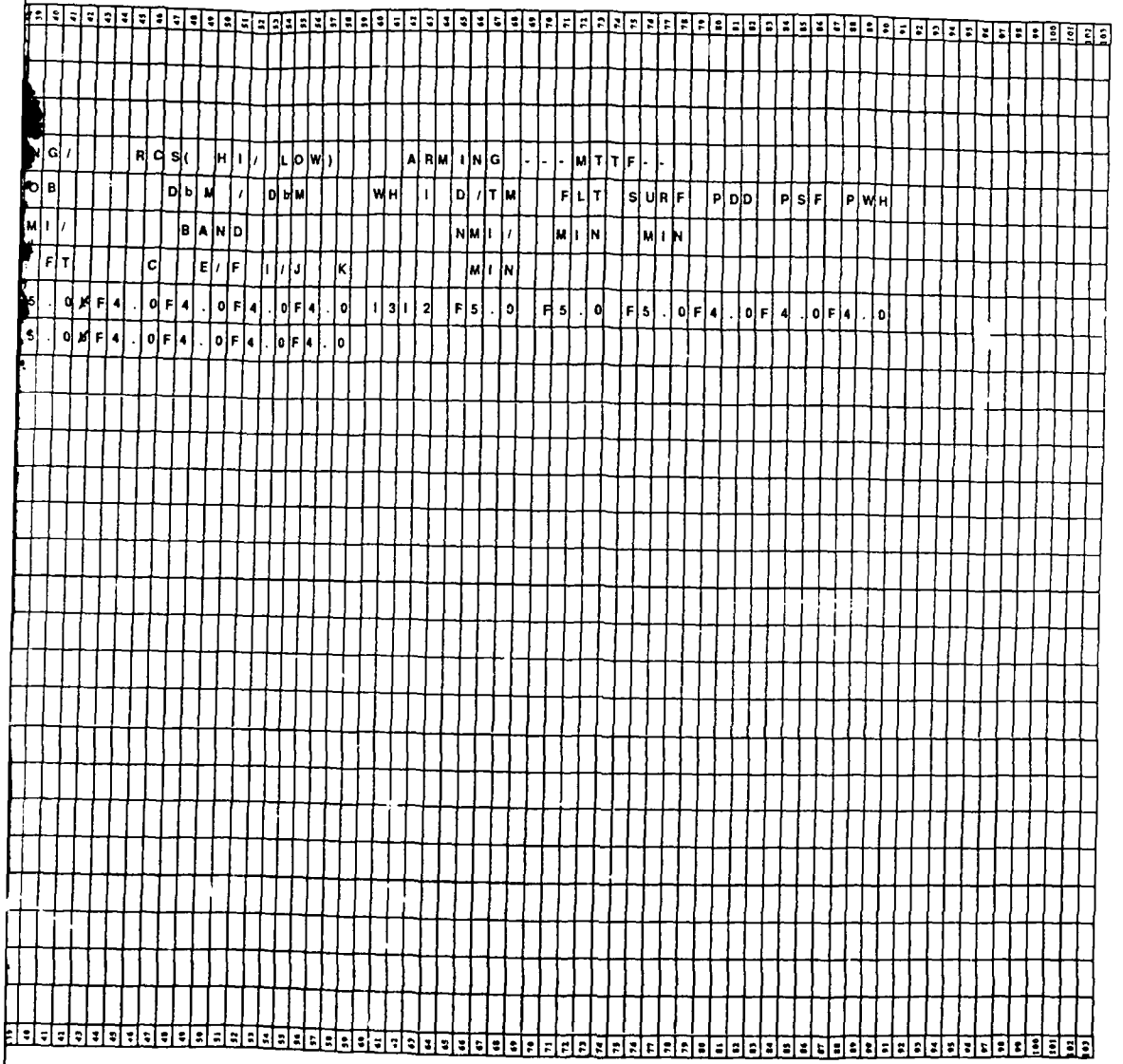

NG/ RCS(HI/ LOW) ARMING --MTTF--
OB DbM / DbM WHI D/TM FLT SURF PDD PSF PWH
MI/ BAND NMI/ MIN MIN
FT C E/F I/J K MIN
5.0F4.0F4.0F4.0F4.0 1312 F5.0 F5.0 F5.0F4.0F4.0F4.0
5.0F4.0F4.0F4.0F4.0

Figure 2.12-1

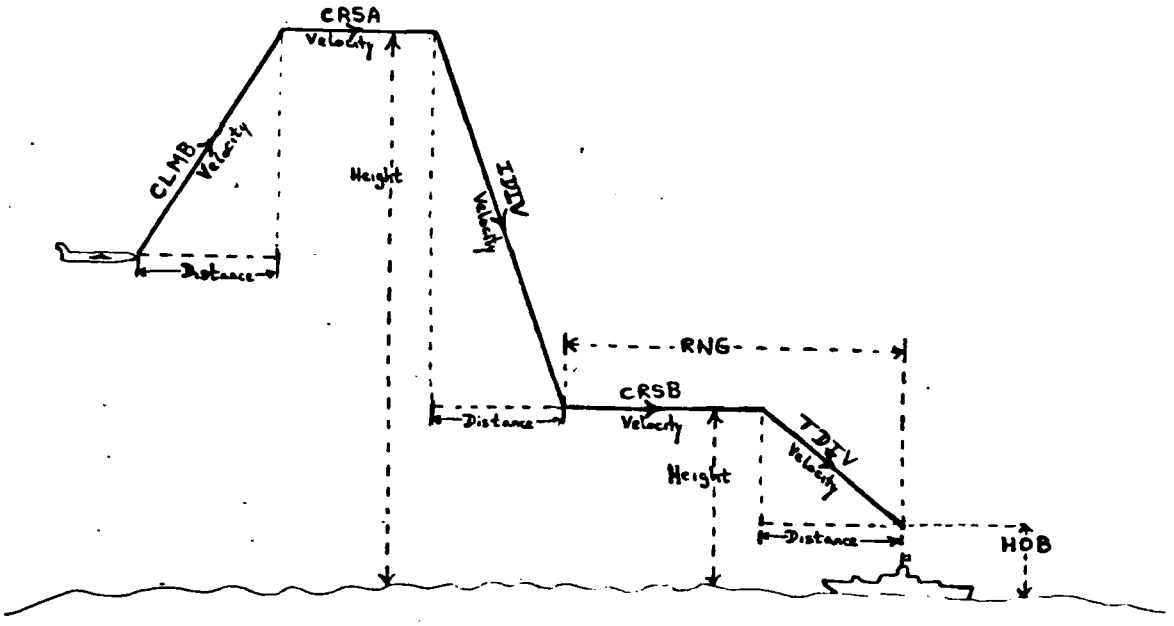
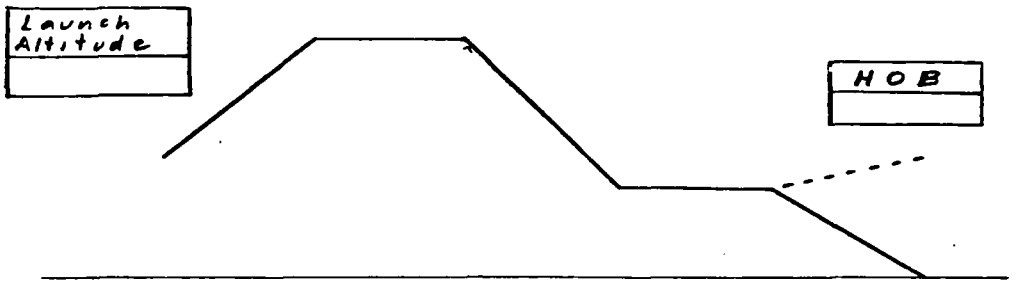


Figure 2.12-2 Red Missile Flight Profile

ASM PROFILE



	CLIMB PHASE	CRUISE A	INITIAL DIVE	CRUISE B	TERMINAL DIVE
HEIGHT					
Δ HEIGHT		——		——	
SPEED					
HORIZ. VEL					
DISTANCE					
TIME					

Figure 2.12-3. ASM Profile Worksheet

2.13 File 18 - Nuclear Warhead Characteristics

The nuclear weapon characterization: yield; neutron output, prompt gamma energy fraction and pulse width; and, effective thermal yield for nuclear warheads associated with both Red and Blue weapons is specified by warhead type. The file layout is included as Figure 2.13-1. Two title lines precede line image A, followed by a single-valued parameter, which is followed by two column heading lines which precede line image B. The file contains a variable number of data lines representing different warhead types. The following is a description of the data elements.

TABLE 18

FILE 18 - NUCLEAR WARHEAD CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	30-32		I3	Number of warhead types: (between zero and ten).
B	8-17		F10.0	Gamma-fluence-to-dose conversion factor (Rad(SI)cm2/cal, real).
C	1-2	WT	I2	Warhead type number, (from one to ten) corresponding to a particular weapon (dimensionless, integer).
	3-10	YIELD KT	F8.0	Burst yield (kilotons, real).
	11-19	NEUT KT	F9.0	Scaled neutron output of burst (neutrons per kiloton, real).
	20-28	XPGAM	F8.0	Prompt gamma energy fraction (dimensionless, real).
	29-37	GAMMA PW/SEC	F9.0	Effective prompt gamma pulse width (seconds, real).
	38-46	EFF. THERMAL YIELD(KT)	F9.0	Effective thermal yield (kilotons, real).

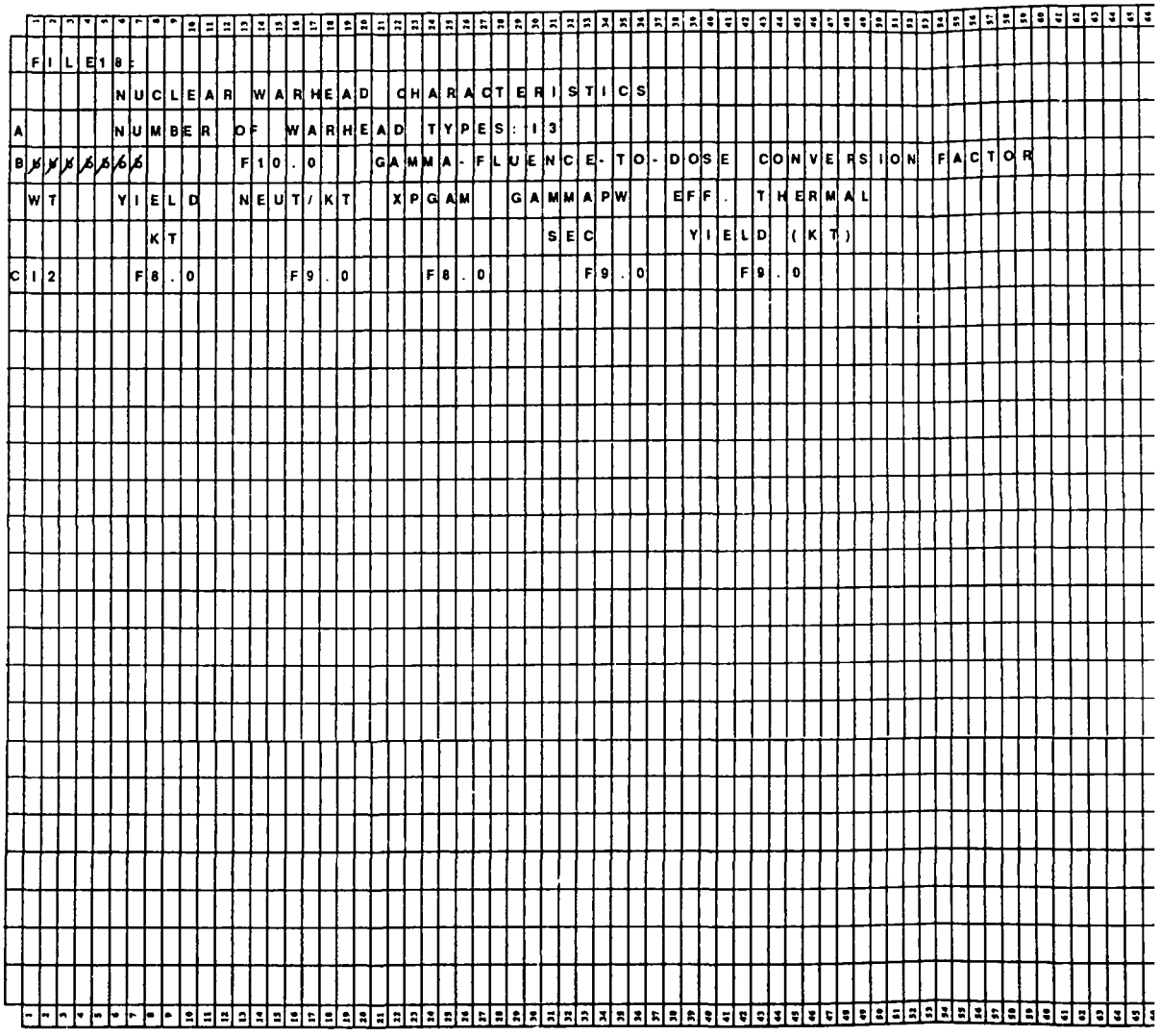

FILE18:
NUCLEAR WARHEAD CHARACTERISTICS
A NUMBER OF WARHEAD TYPES: I3
B/X/X/X/X/X/X F10.0 GAMMA-FLUENCE-TO-DOSE CONVERSION FACTOR
WT YIELD NEUT/KT XPGAM GAMMAPW EFF. THERMAL
KT SEC YIELD (KT)
C I2 F8.0 F9.0 F8.0 F9.0 F9.0

Figure 2.13-1

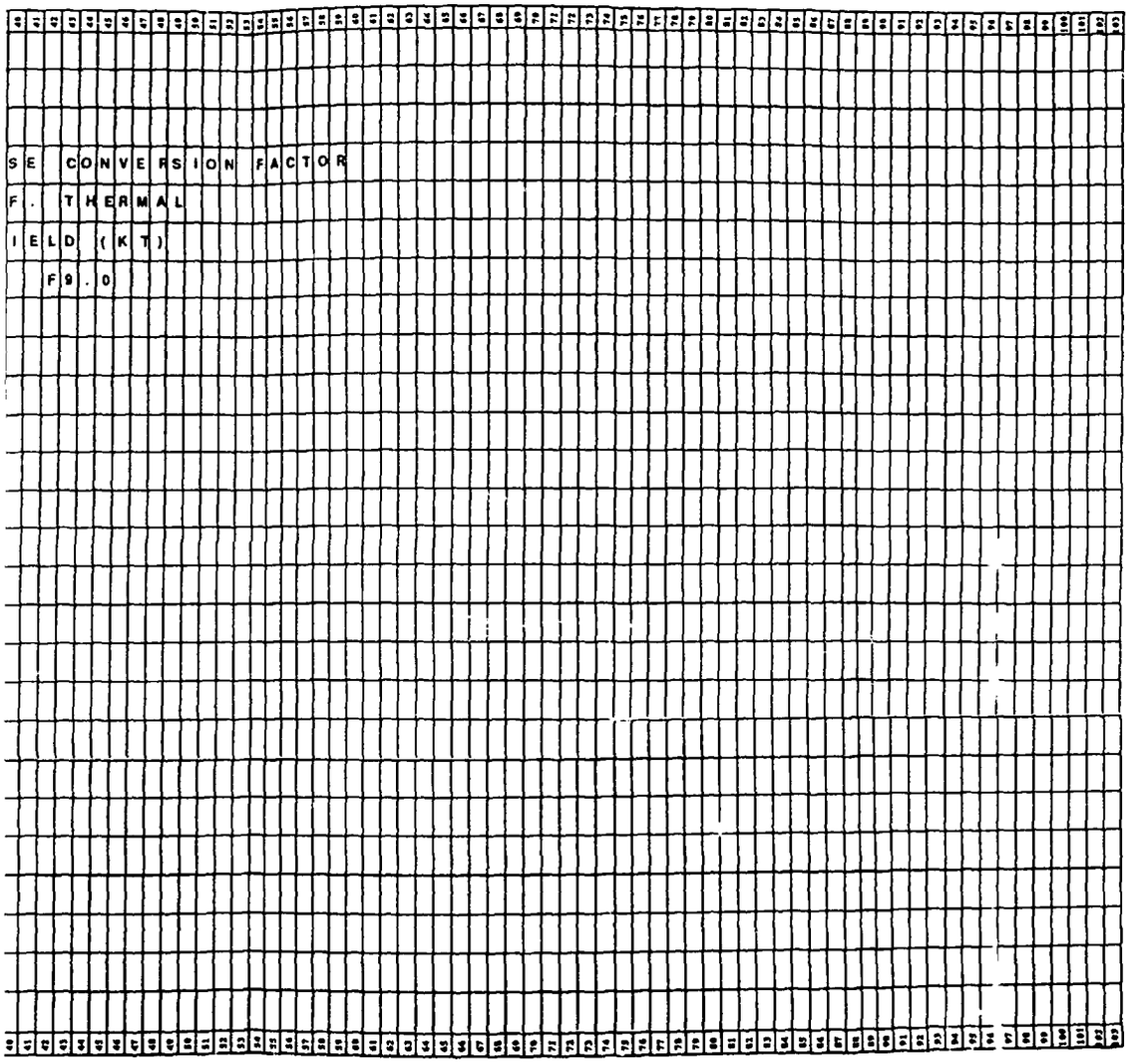


Figure 2.13-1

2.14 File 19 - Red Jammer Characteristics

The characterization of Red Jammers: jamming power; maximum bandwidth; minimum bandwidth; and, automatic jamming victim list for each Red jammer is specified. The file layout is included as Figure 2.14-1. Two title lines precede line image A, followed by line image B and line image C. Two column heading lines and a blank line precede line image D. The file contains a variable number of data lines representing different types of jammers. The following is a description of the data elements.

TABLE 19

FILE 19 - RED JAMMER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	33-34		I2	Number of Red Jammer types: (between zero and eight).
B	34		L1	Flag indicating automatic Red jamming: T: ON F: OFF
C	32-34		I3	Time for RED to recognize BLUE tracking and start jamming.
NOTE: A Line image C is required. If automatic jamming flag is false, the data is not used.				
FOR EACH RED JAMMER TYPE:				
D	1-2	JT	I2	Number (from 1 to RD_JMT) corresponding to a particular type of Red jammer (dimensionless, integer).
	3-9	POW WATTS	F7.0	Total effective radiated power (watts, real). No commas.
	10-14	MXW MHZ	F5.0	Maximum jamming bandwidth (megahertz, real).

TABLE 19 (continued)

FILE 19 - RED JAMMER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
D (cont)	15-18	MNW MHZ	F4.0	Minimum jamming bandwidth (megahertz, real).

NOTE: If the jammer is being used against more than one Blue Sensor at the same time, the minimum jamming bandwidth entry should reflect the bandwidth over which this jammer must spread it's power in order to cover both victim sensors.

NOTE: The following data is under the general heading BLUE SENSORS. It is a list of the sensor numbers against which the jammer will be used for reactive jamming.

19-21	1	I3	First BLUE sensor number
22-24	2	I3	Second BLUE sensor number
25-27	3	I3	Third BLUE sensor number
28-30	4	I3	Fourth BLUE sensor number
31-33	5	I3	Fifth BLUE sensor number
34-36	6	I3	Sixth BLUE sensor number

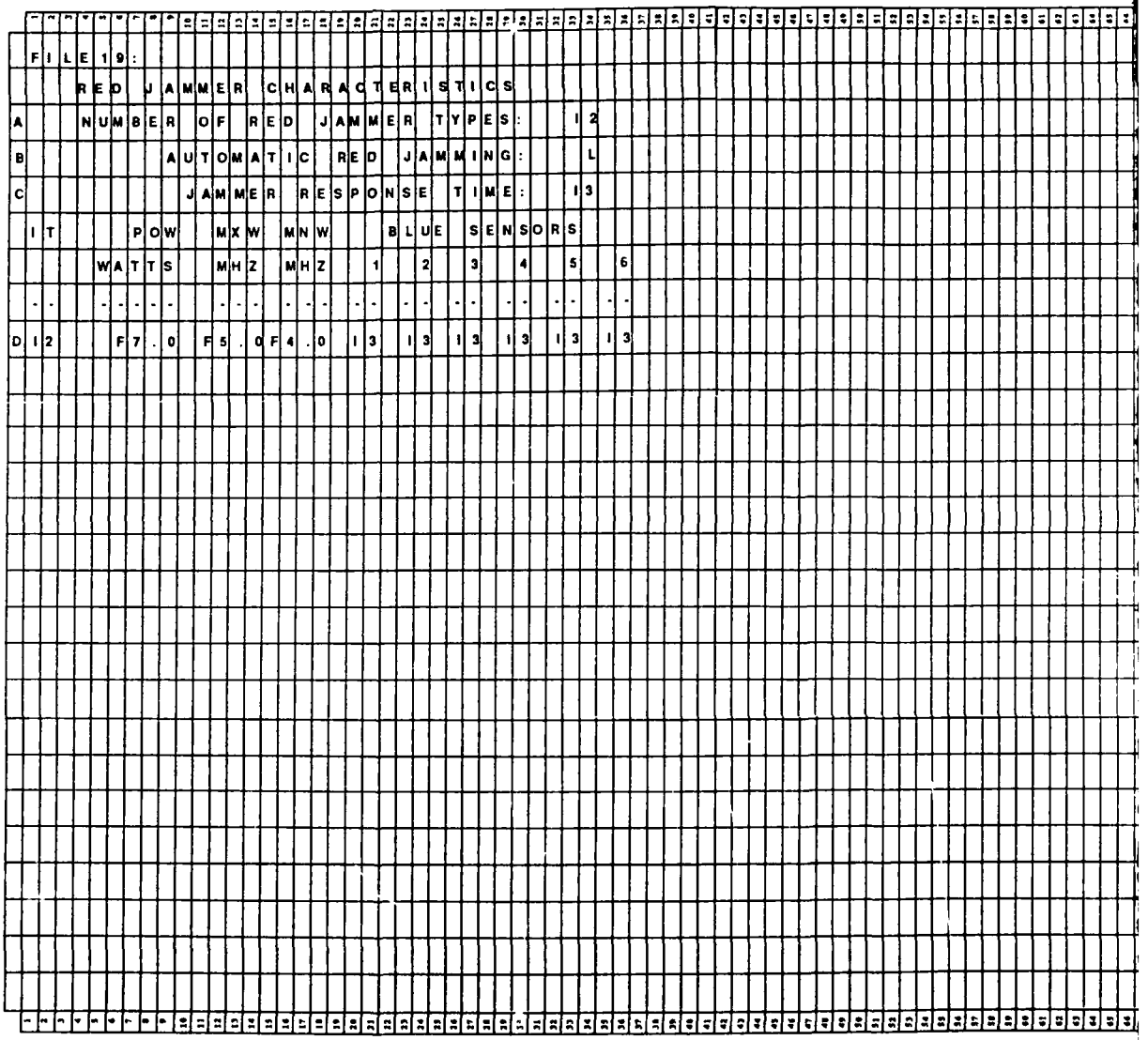

FILE 19:
RED JAMMER CHARACTERISTICS
A NUMBER OF RED JAMMER TYPES: I 2
B AUTOMATIC RED JAMMING: L
C JAMMER RESPONSE TIME: I 3
IT POW MXW MNW BLUE SENSORS
WATTS MHZ MHZ 1 2 3 4 5 6
D I 2 F7.0 F5.0 F4.0 I 3 I 3 I 3 I 3 I 3 I 3

Figure 2.14-1

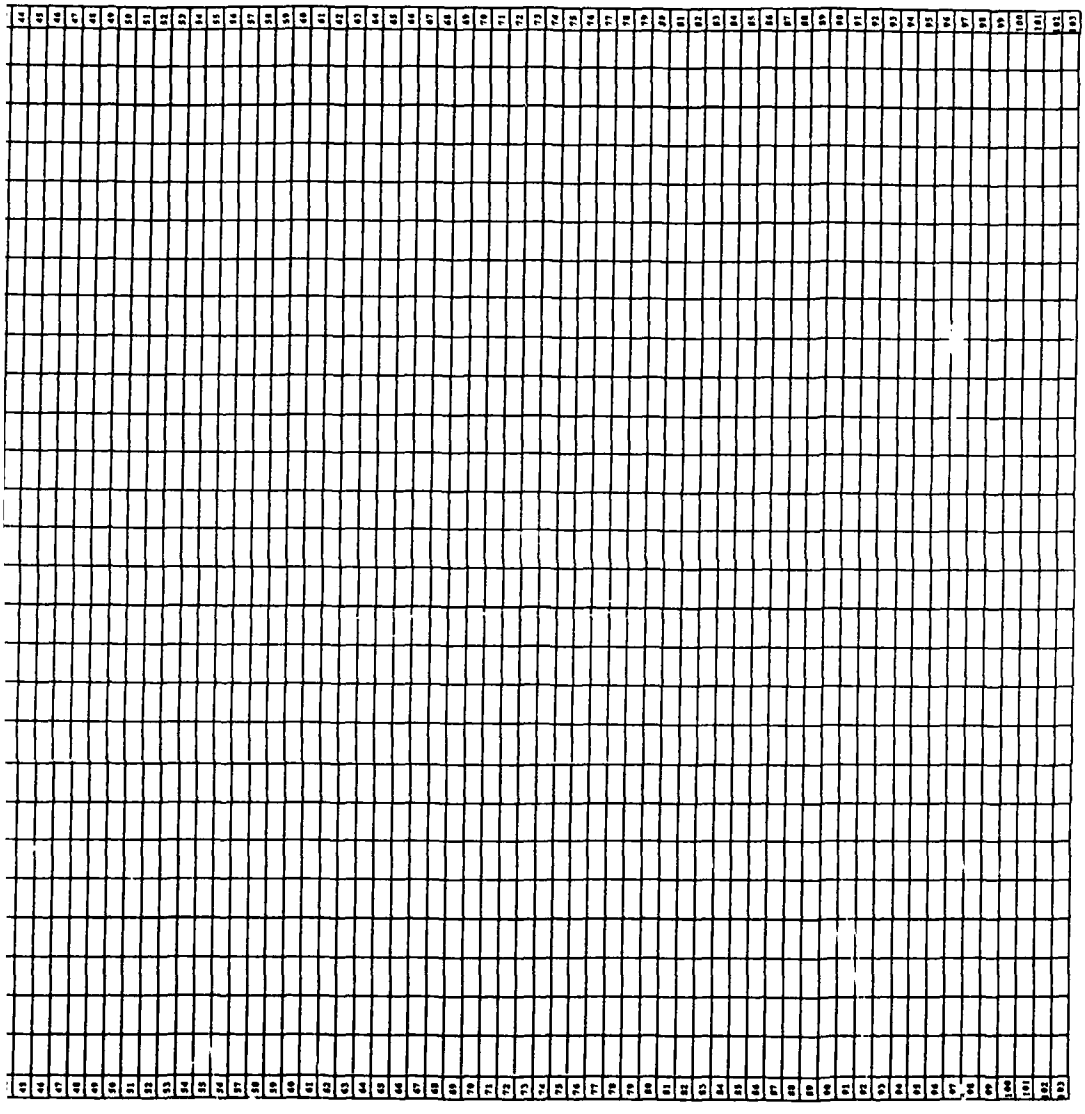


Figure 2.14-1

2.15 File 20 - CV Characteristics

Aircraft carrier identification and launch performance for the Blue aircraft carriers is specified. The file layout is shown in Figure 2.15-1. Two title lines precede line image A followed by two column heading lines which precede line image B, representing different carriers. The following is a description of the data elements

TABLE 20

FILE 20 - CV CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	25-26		I2	Number of carriers (between zero and five).
FOR EACH CARRIER:				
B	1-2	CV	I2	Index (from 1 to 5) for a particular aircraft carrier (dimensionless, integer).
	3-9	BLUID	I7	Blue unit identification which must correspond to a BID value in File 21 (Blue Units) with functional type of 1, i.e., ship (dimensionless, integer).
	10-16	MIDT MIN	F7.0	Mean interdeparture time between successive aircraft launches (minutes, real).

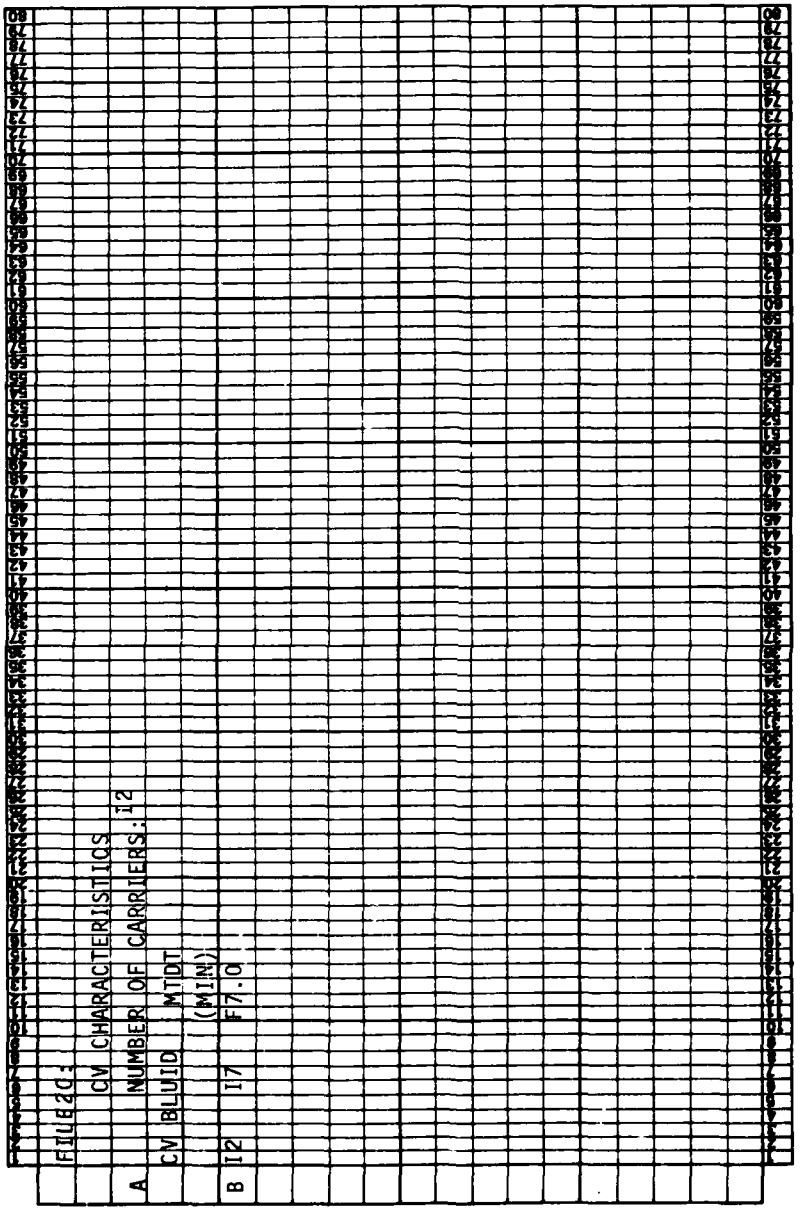

FILE2C:
CV CHARACTERISTICS
NUMBER OF CARRIERS: I2
A
CV BLUID MTDT
(MIN)
B I2 I7 F7.0

Figure 2.15-1

2.16 File 21 - Blue Units

The individual Blue units in the game are identified and their disposition and missions are specified. The file layout is shown in Figure 2.16-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, each of which describes a Blue unit. All Blue ships, VAW aircraft, VAQ aircraft, and VF aircraft that are in the air at the beginning of the game must be listed, in that order. VF aircraft that are on the CV are not listed in this file (they are identified in File 20). The following is a description of the data elements.

TABLE 21

FILE 21 - BLUE UNITS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	27-30		I4	Number of Blue units (between zero and 190). Include all Blue ships, VAW aircraft, VAQ aircraft, and VF aircraft that are in the air at the beginning of the wargame, listed in that order. Does not include aircraft that are initially on deck (these are identified in File 22, Blue Air Plan: Airborne Aircraft and Alert Schedule).
FOR EACH BLUE UNIT:				
B	1-3	BID	I3	Blue unit identification number; must be consecutive numbers beginning with one. Units must be listed in order of functional (or mission) type. The file may include up to 60 ships and VAW aircraft and up to 67 fighters (dimensionless, integer).

TABLE 21 (continued)

FILE 21 - BLUE UNITS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	4-6	FT	I3	Functional or mission type number: 1 - ship; 2 - VAW aircraft; 3 - VAQ aircraft (not yet implemented); 4 - fighter aircraft (dimensionless, integer).
	7-9	PT	I3	Platform type number for this ship or aircraft: Ships must correspond to PTS values in File 14, Blue Ship Characteristics; Aircraft must correspond to PTA values in File 12, Blue Aircraft Characteristics. Example Values: Ships: 1 - CVN-68; 2 - CGN-38; 3 - CGN-35; 4 - CG-26; 5 - CG-16; 6 - DDG-47; 7 - DDG-10; 8 - DDg-2; Aircraft: 1 - E-2C; 2 - EA-6B; 3 - F-14 (dimensionless, integer).
	10-16	DLEVEL	I7	The initial degree of damage to a ship: 0 - 6. (dimensionless, integer).

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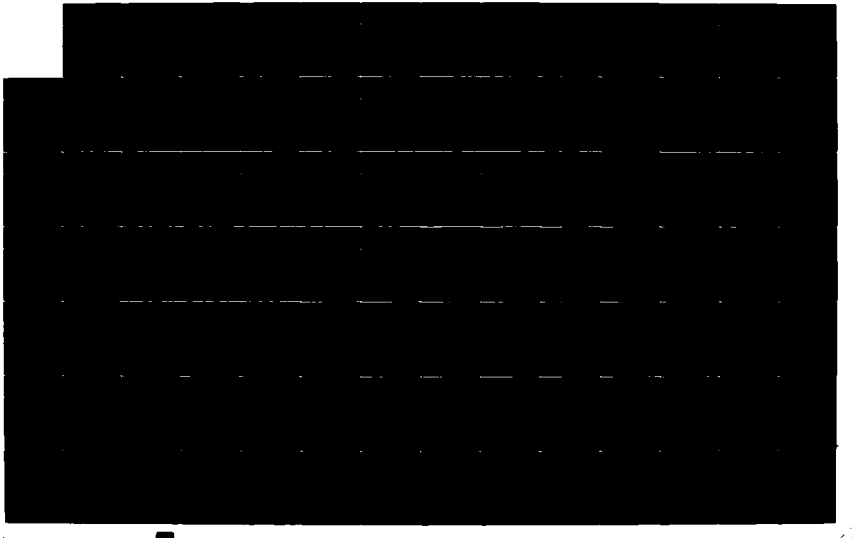
UNCLASSIFIED F/G 15/7 NL



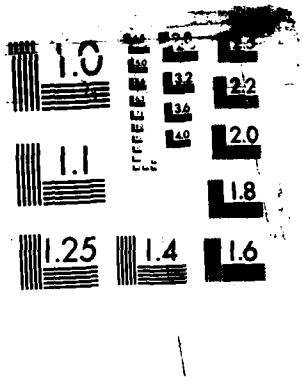


TABLE 21 (continued)

FILE 21 - BLUE UNITS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	17-24	XCOORD NMI	F8.0	Initial X-coordinate of Blue unit (nautical miles, real).
	25-32	YCOORD NMI	F8.0	Initial Y-coordinate of Blue unit (nautical miles, real).
	33-38	ALTD KF	F6.0	Initial altitude of Blue unit; for ships, set equal to antenna height (kilofeet, real).
		SHIP UNIS ONLY:		
	39-42	SFP	I4	SAM firing policy, if number not in proper range an error message will be printed at the line the error occurs. (dimensionless, integer).
	43-48	SECT1 DEG	F6.0	Counterclockwise angular limit of SAM ship self-assignment sector, true bearing (degrees, real). NOTE: For full circle or no self-assignment sector enter zero.
	49-54	SECT2 DEG	F6.0	Clockwise angular limit of SAM ship self-assignment sector, true bearing (degrees, real). NOTE: For full circle enter 360; For no self-assignment sector, zero.
	55-59	CONV SAM	I5	The number of conventional SAMs in the magazines of this ship. (surface to air missile, integer).
	60-63	NUC SAM	I4	The number of nuclear SAMs in the magazines of this ship. (surface to air missile, integer).

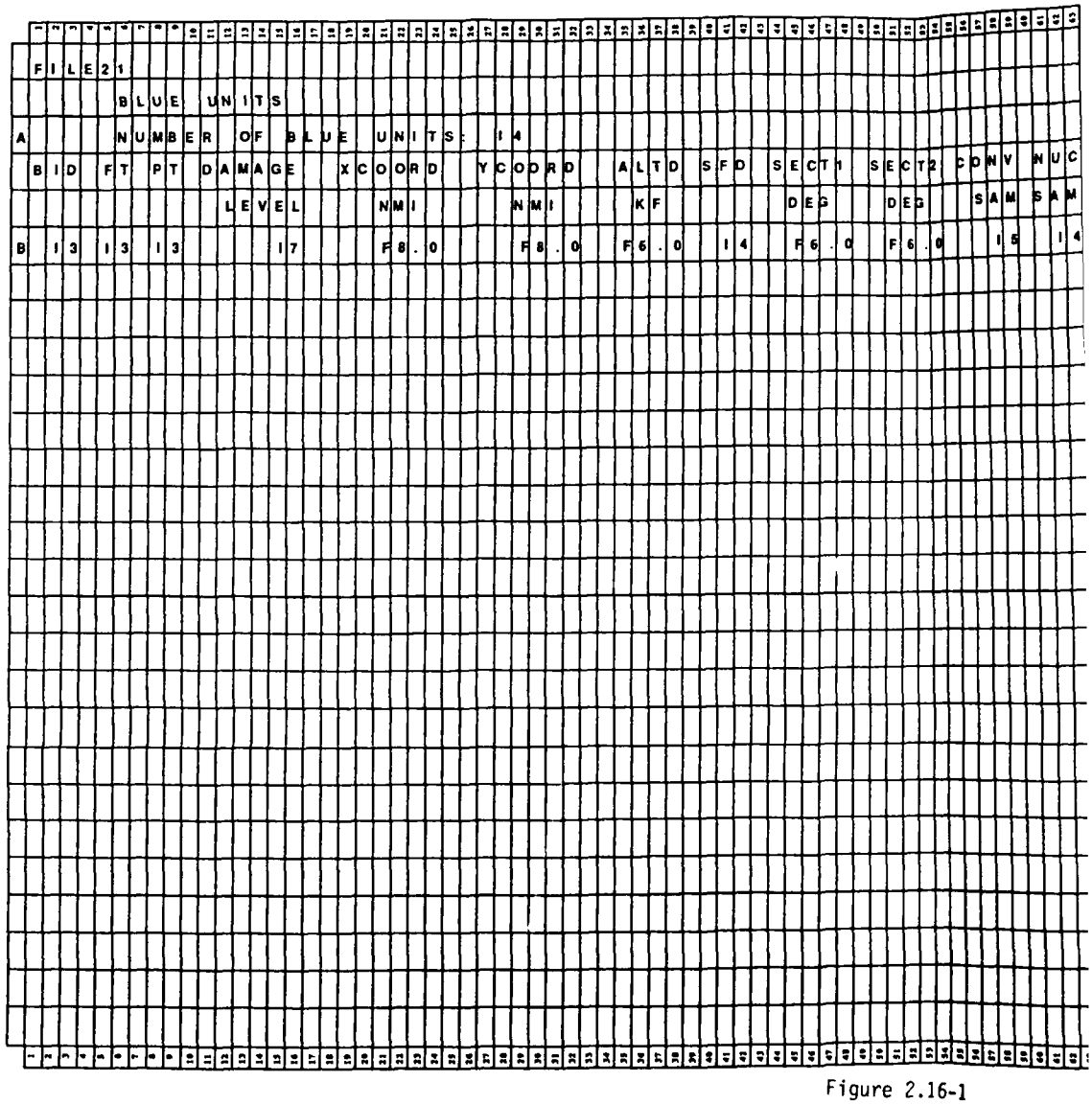

FILE21
BLUE UNITS
A NUMBER OF BLUE UNITS: 14
B ID FT PT DAMAGE XCOORD YCOORD ALTD SFD SECT1 SECT2 CONV NUC
LEVEL NMI NMI KF DEG DEG SAM SAM
B I3 I3 I3 I7 F8.0 F8.0 F6.0 I4 F6.0 F6.0 I5 I4

Figure 2.16-1

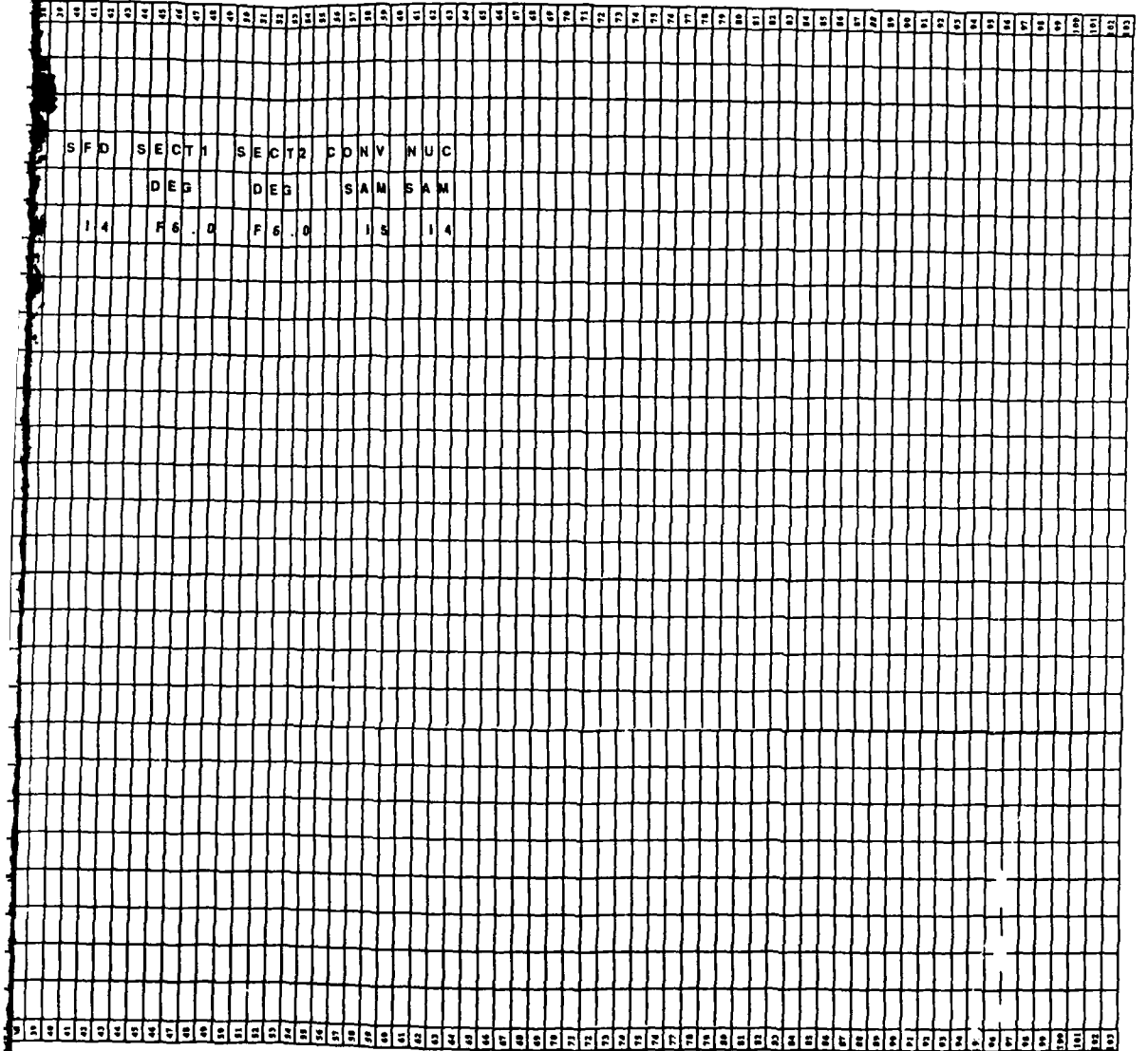


Figure 2.16-1

2.17 File 22 - Blue Air Plan

The locations of fighter and airborne early warning stations and the status of aircraft at the beginning of the scenario are specified. All stations that might be occupied during the game should be listed, even if no aircraft are assigned to them at the start of the game. The File layout is included as Figure 2.17-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, each of which defines a CAP station. The second half of the input is in direct relationship to the aircraft already in the air or in a state of readiness on the carrier. The following is a description of the data elements.

TABLE 22

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY):
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	30-32		I3	Fixed defensive posture: Number of Aircraft stations (between zero and fifteen).
FOR EACH FIXED STATION:				
B	1-2	IC	I2	Number (from 1 to 15) identifying a particular fixed station (dimensionless,integer).
	3-11	BEARING DEG	F9.0	Bearing of fixed station referenced to Force Center (degrees, real).
	12-18	RANGE NMI	F7.0	Range of fixed station from Force Center (nautical miles, real).
	19-28	ALTD KFT	F10.0	Altitude of fixed station (kilofeet, real).

TABLE 22 (continued)

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY):
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	29-34	SIZE	F6.0	Width of the station to be patrolled using back-and-forth tactics (degrees, real).
	35-41	FTYPE	I7	Functional or mission type number to fill station, must be 4, fighter or 2, early warning, (dimensionless, integer).
	42-48	PTYPE	I7	Platform type number to fill station, must correspond to PTA number in File 09, Early Warning aircraft characteristics, File 12, Blue Fighter aircraft characteristics or File 07, Electronic Warfare aircraft characteristics. (dimensionless, integer).

NOTE: This input variable is provided for flexibility in certain special scenarios. In normal usage the space is left blank so that all platform types of the required functional type can be used interchangably on the station.

	49-54	BUID	I6	Blue unit identification number of airborne aircraft initially assigned to the fixed station: must correspond to a BID value in File 21, Blue Units; or zero to indicate that no airborne aircraft is assigned to the fixed station at start. (dimensionless, integer).

TABLE 22 (continued)

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY):
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE FOR DESCRIPTION	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
OF AIRBORNE AIRCRAFT AND ALERT SCHEDULE:				
C	1-2	AS	I2	Alert state (dimensionless, integer): 0 - Airborne aircraft; 1 - Soonest alert; 2 - Second soonest alert; 3 - Third soonest alert; 4 - Other aircraft, assumed to be Alert 60 minutes 5 - Aircraft in maintenance status. NOTES: Alert states may be omitted starting with 3, then 2. Aircraft in maintenance status will be repaired and placed into state 4 based on the mean time to repair.
	3-6	CV NUM	I4	Aircraft carrier index, must correspond to a CV value in File 20, CV characteristics (dimensionless,integer).
	7-10	A/C CNT	I4	Number of aircraft in the alert state (aircraft, integer). Must be 1 for AS=0 (need separate line image C for each aircraft that is initially airborne).
	11-19	TKOFF TM/FUEL REM MIN /LB	I9	For non-zero alert state, the corresponding time to launch; (minutes, integer). For airborne aircraft (AS = 0), fuel remaining start of the game (pounds, integer).

TABLE 22 (continued)

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY):
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	20-24	A/C BUID	I5	For aircraft initially airborne (AS = 0), Blue unit identification number which must correspond to a BID value in File 21, Blue Units. NOTE: aircraft need not be assigned to a fixed station at start. For aircraft on deck (AS nonzero) value is zero. (BLUE unit id, integer).
	25-30	A/C FTYPE	I6	Aircraft functional type number 2 - VAW; 3 - VAQ (not yet implemented); 4 - VF (dimensionless, integer).
	31-36	A/C PTYPE	I6	Aircraft platform type number, must correspond to a PTA value in File 12, Blue Fighter Characteristics, File 07, VAW Characteristics or File 07, Electronic Warfare aircraft characteristics. (dimensionless, integer).
	37-42	FUEL LOAD LBS	I6	Initial fuel capacity, required for all alert states (both airborne and on deck aircraft). (pounds, integer).
FOR UP TO FOUR TYPES OF AIR-TO-AIR-MISSILES (FIGHTERS ONLY):				
	43-45	C1	I3	Number of first missile type onboard the aircraft (missiles, integer).

TABLE 22 (continued)

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY): DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	46-48	T1	I3	Missile type number of first type of Blue air-to-air missile; must correspond to an MT value in File 13, Blue Aircraft Missile Characteristics. Is a nuclear tipped air intercept missile. (dimensionless, integer).
	49-51	C2	I3	Number of second missile type onboard the aircraft (missile, integer).
	52-54	T2	I3	Missile type number of second type of Blue air-to-air missile; must correspond to an MT value in File 13, Blue Aircraft Missile Characteristics. Is a long-range air-intercept missile. (dimensionless, integer).
	55-57	C3	I3	Number of third missile type onboard the aircraft (missile, integer).
	58-60	T3	I3	Missile type number of third type of Blue air-to-air missile; must correspond to an MT value in File 13, Blue Aircraft Missile Characteristics. Is a medium range air-intercept missile. (dimensionless, integer).
	61-63	C4	I3	Number of fourth missile type onboard the aircraft (missile, integer).

TABLE 22 (continued)

FILE 22 - BLUE AIR PLAN (FIGHTERS, EARLY WARNING AIRCRAFT AND ELECTRONIC SUPPORT AIRCRAFT ONLY):
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	64-66	T4	I3	Missile type number of fourth type of Blue air-to-air missile; must correspond to an MT value in File 13, Blue Aircraft Missile Characteristics. Is a minimum range air-intercept missile. (dimensionless, integer).

Search performance can be enhanced by patrolling a station rather than holding close to the center of the station in essentially a stationary position. Figure 2.17-2, Detection Performance while Patrolling a Station, is furnished to aid the user in sizing the station. The range from force center is entered at the bottom of the first chart. A line is projected vertically to intersect the width of the sector to be covered by a single station. A horizonal line is drawn to the second chart to intersect the effective search width. A vertical line is drawn to intersect the curves labeled gamma, the ratio of searcher speed to target speed. A gamma of zero means that the station is not partolled; a gamma of one means that the patrol speed and expected target speed are equal. The detection probability is read from the abscissa to the left.

Within NADS, aircraft fly out a course to the edge of the station nearest North and begin back and forth patrolling from that point. This is done to cover all of the station once before repeating any portion of the station.

The user should note that effective search width is twice the range of a definite range law of detection which is equivalent to the given law of detection in the sense that each of the two laws detects the same number of uniformly distributed targets of identical velocity. Search width is an operational measure of performance which should be based on operational data. Use of the radar equation to calculate detection range, for example, will lead to optimistic detection performance.

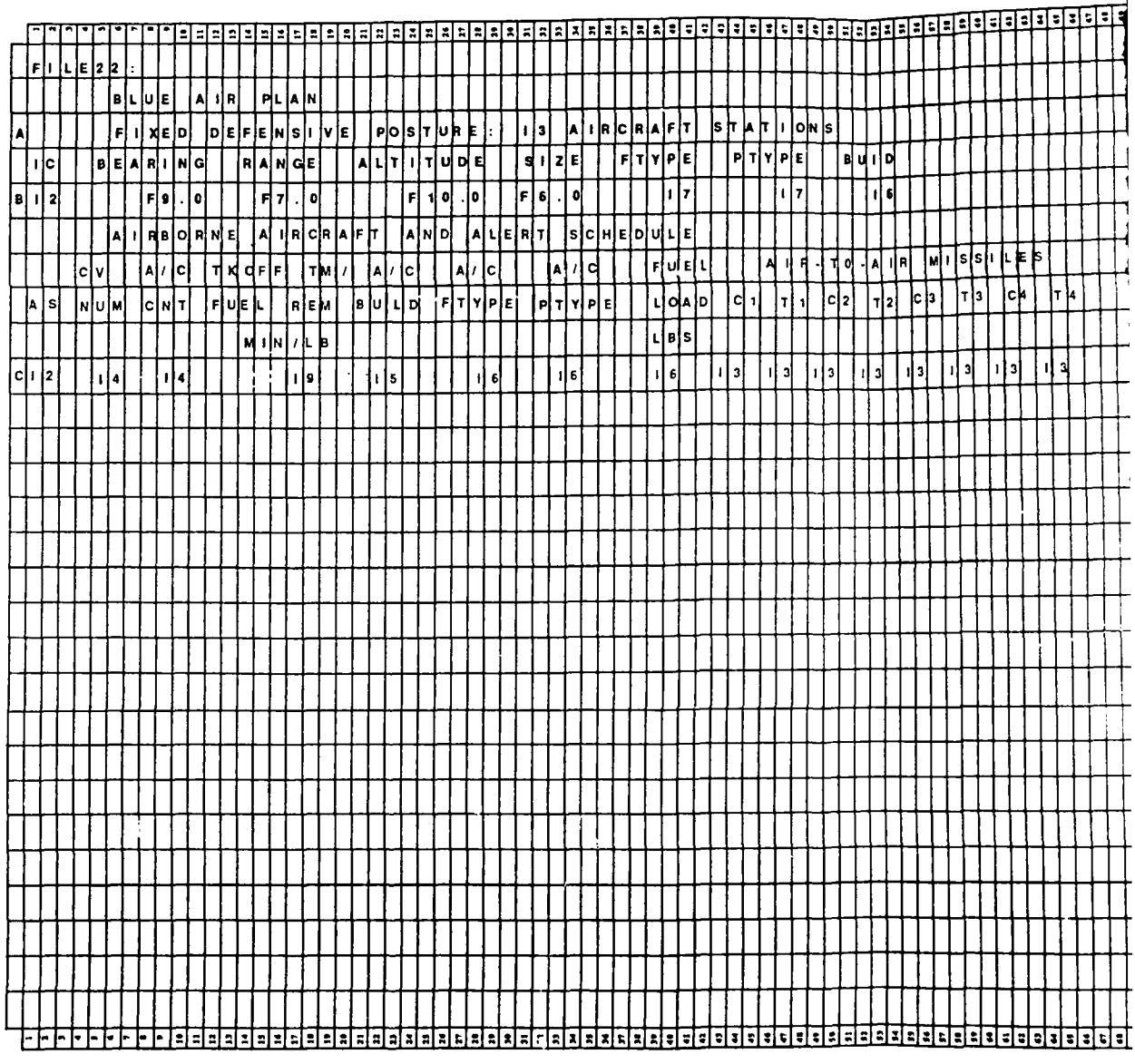

FILE22:
BLUE AIR PLAN
A FIXED DEFENSIVE POSTURE: 13 AIRCRAFT STATIONS
IC BEARING RANGE ALTITUDE SIZE FTYPE PTYPE BUID
B12 F9.0 F7.0 F10.0 F6.0 17 17 16
AIRBORNE AIRCRAFT AND ALERT SCHEDULE
CV A/C TKOFF TM/ A/C A/C A/C FUEL AIR-TO-AIR MISSILES
AS NUM CNT FUEL REM BULD FTYPE PTYPE LOAD C1 T1 C2 T2 C3 T3 C4 T4
MIN/LB LBS
C12 14 14 19 15 16 16 16 13 13 13 13 13 13 13 13

Figure 2.17-1

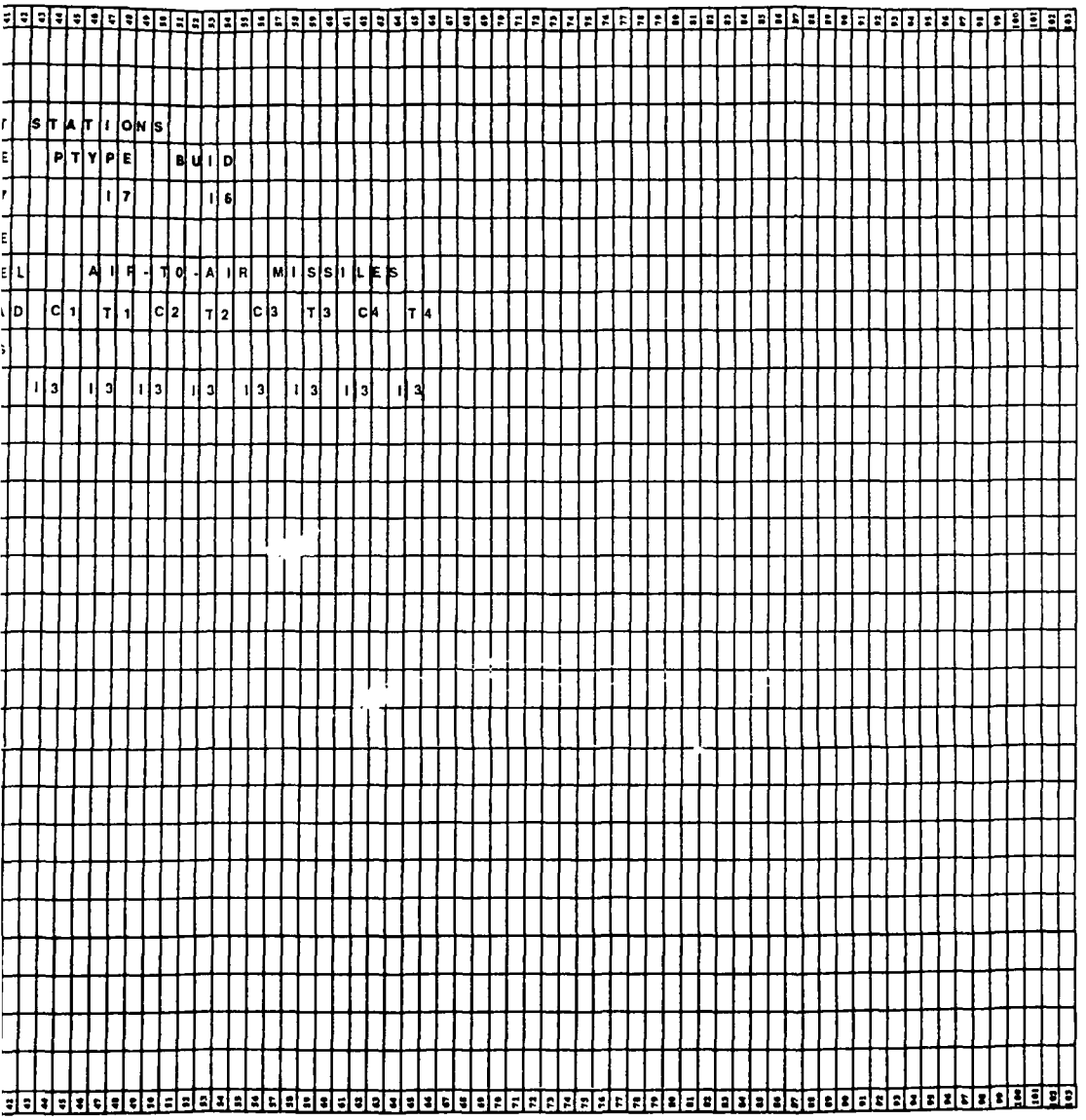
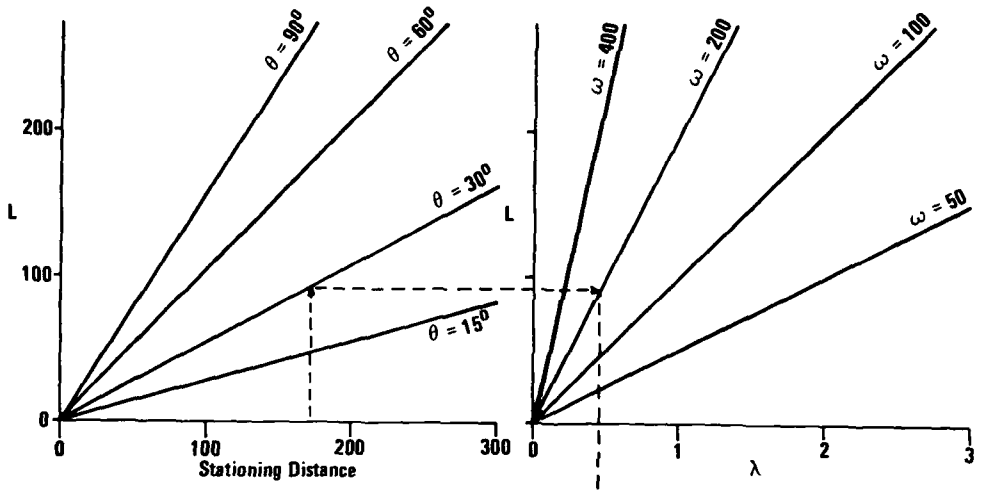

STATIONS
PTYPE
BUID
17
16
AIR-TO-AIR MISSILES
D C1 T1 C2 T2 C3 T3 C4 T4
13 13 13 13 13 13 13 13

Figure 2.17-1

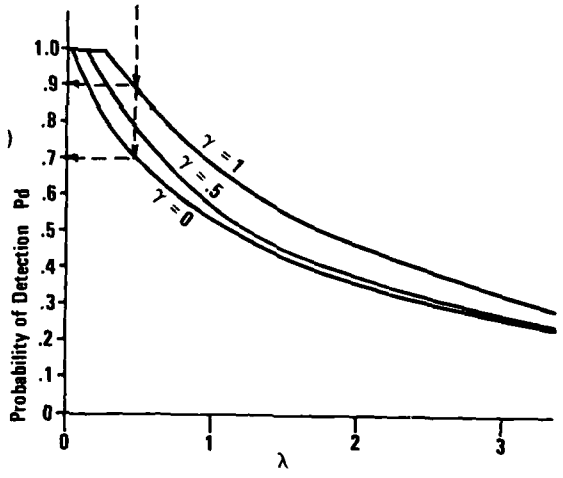


For back and forth patroling, the probability of detection is given* by

$$P = \left\{1 - \left(\lambda - \frac{\sqrt{\gamma + 1} - 1}{2}\right)^2 \Big/ \lambda(\lambda+1)\right.$$

if $\gamma \leq 2\sqrt{\lambda(\lambda+1)}$

otherwise P = 1



Where

$\lambda = \frac{L}{\omega}$ and $\gamma = \frac{\nu}{\upsilon}$

ν = searchers' speed

υ = target speed

L = width of the barrier

ω = effective search width

P is a minimum at $\gamma = 0$ which applies when the searcher is stationed at a fixed point

* OEG Report 56, Search and Screening section 7.1.4

Figure 2.17-2
DETECTION PERFORMANCE

2.18 File 23 - Red Aircraft Scenario

The individual aircraft participating in the Red attack are identified along with their flight plans. Positions, speeds, jammer employment and targets are specified. The file layout is included as Figure 2.18-1. Two title lines precede line image A and two column heading lines precede line image B. Each flight plan is composed of a variable number of data lines, depending on the number of nodes, or events, defined for the aircraft. The following is a description of the data elements.

TABLE 23

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	29-31		I3	Number of Red aircraft (between zero and 60).
B	58-63		I6	Time increment to be added or subtracted to adjust the scenario entry times for RED aircraft in this file, firing times for surface and sub-surface ASCM's in file 25 and observation/receipt of surveillance date in file 40.
FOR EACH RED AIRCRAFT:				
B	1-3	RU	I3	Red aircraft identification number ordered by functional or mission type. (dimensionless, integer)
	4-5	F	I2	Red aircraft functional or mission type number 1 - Bomber; 2 - Fighter escort; 3 - Reconnaissance; 4 - Standoff jammer. (dimensionless, integer):

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	6-8	PT	I3	Red aircraft platform designation, must correspond to a PT value in File 16, Red Aircraft Characteristics. Examples: 1 - Backfire; 2 - Blinder; 3 - Bear; 4 - Foxbat. (dimensionless, integer):
	8-14	ITM	F7.0	Time Red aircraft enters game based on an initial time of one second (minutes, real).
	15-17	T1	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 1, must correspond to BID value in File 21, Blue Units. (dimensionless, integer).
	18-20	T2	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 2 (dimensionless, integer).
	21-23	T3	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 3 (dimensionless, integer).
	24-26	T4	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 4 (dimensionless, integer).
	27-29	NC	I3	Total number of nodes specified in flight plan for this Red aircraft (nodes, integer).

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	30-32	NT	I3	Node or event type for first node of flight plan, NT value must be 1 or 5 (enter game) on line image B. (dimensionless, integer).
	33-41	XCOORD NMI	F9.0	X-coordinate of first node. First node expected to be beyond organic detection. (nautical miles, real).
	42-50	YCOORD NMI	F9.0	Y-coordinate of first node. (nautical miles, real).
	51-57	ALTD KF	F7.0	Altitude of first node (kilofeet, real).
	58-63	VELC KN	F6.0	Aircraft speed between first node and second node, must not be zero. A pseudo stationary position (e.g., an orbiting jammer) can be defined by a speed less than 10 knots, the station time being controlled by the proximity of the next node (knots, real).
FOR UP TO TWELVE TYPES OF TARGETED BLUE SENSORS:				
	64-65	1	I2	First type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	66-67	2	I2	Second type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	68-69	3	I2	Third type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	70-71	4	I2	Fourth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	72-73	5	I2	Fifth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	74-75	6	I2	Sixth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	76-77	7	I2	Seventh type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	78-79	8	I2	Eighth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	80-81	9	I2	Ninth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	82-83	7	I2	Tenth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	84-85	7	I2	Eleventh type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	86-87	7	I2	Twelfth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
FOR EACH SUCCESSIVE NODE IN FLIGHT PLAN FOR THIS RED AIRCRAFT:				
C	8-14	ITM MIN	F7.0	Time Red aircraft enters scenario based on an initial time of one second (minutes, real).
	30-32	NT	I3	Node or event type, last node must be type 9 or 10 (dimensionless, integer) Nodes implemented: 2 - Change velocity vector; 5 - Radar jammer on; 6 - Radar jammer off; 9 - Reach launch line (bombers launching missiles only); 10 - Leave game (use if node type 9 is not used). Nodes not yet implemented: 3 - Radar on; 7 - Communications jammer on; 8 - Communications jammer off.
	33-41	XCOORD NMI	F9.0	X-coordinate of this node (nautical miles, real).
	42-50	YCOORD NMI	F9.0	Y-coordinate of this node (nautical miles, real).
	51-57	ALTD KF	F7.0	Altitude of this node (kilofeet, real).

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	58-63	VELC KN	F6.0	Aircraft speed between first node and second node, must not be zero. A pseudo stationary position (e.g., an orbiting jammer) can be defined by a speed less than 10 knots, the station time being controlled by the proximity of the next node (knots, real).
FOR UP TO TWELVE TYPES OF TARGETED BLUE SENSORS:				
	64-65	1	I2	First type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
C	66-67	2	I2	Second type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	68-69	3	I2	Third type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	70-71	4	I2	Fourth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	72-73	5	I2	Fifth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)

TABLE 23 (continued)

FILE 23 - RED AIRCRAFT SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	74-75	6	I2	Sixth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	76-77	7	I2	Seventh type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	78-79	8	I2	Eighth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	80-81	9	I2	Ninth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	82-83	7	I2	Tenth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	84-85	7	I2	Eleventh type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)
	86-87	7	I2	Twelfth type of Blue sensor targeted by the jammer in node type 5, zero for node type 1, (dimensionless, integer)

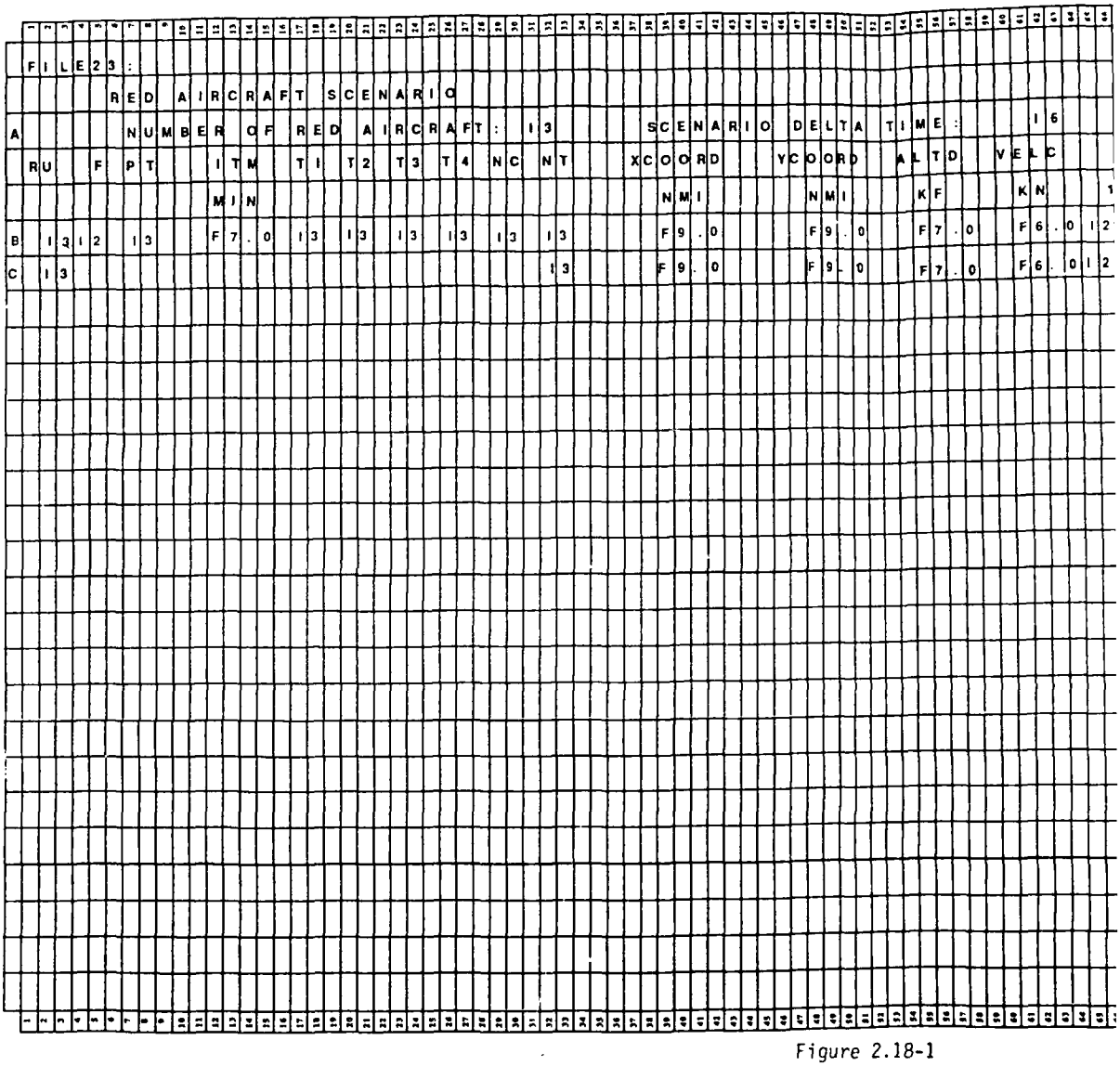

FILE23:
RED AIRCRAFT SCENARIO
A NUMBER OF RED AIRCRAFT: 13 SCENARIO DELTA TIME: 16
RU F PT ITM TI T2 T3 T4 NC NT XCOORD YCOORD ALTD VELC
MIN NMI NMI KF KN
B 1312 13 F7.0 13 13 13 13 13 13 F9.0 F9.0 F7.0 F6.0 12
C 13 13 F9.0 F9.0 F7.0 F6.0 12

Figure 2.18-1

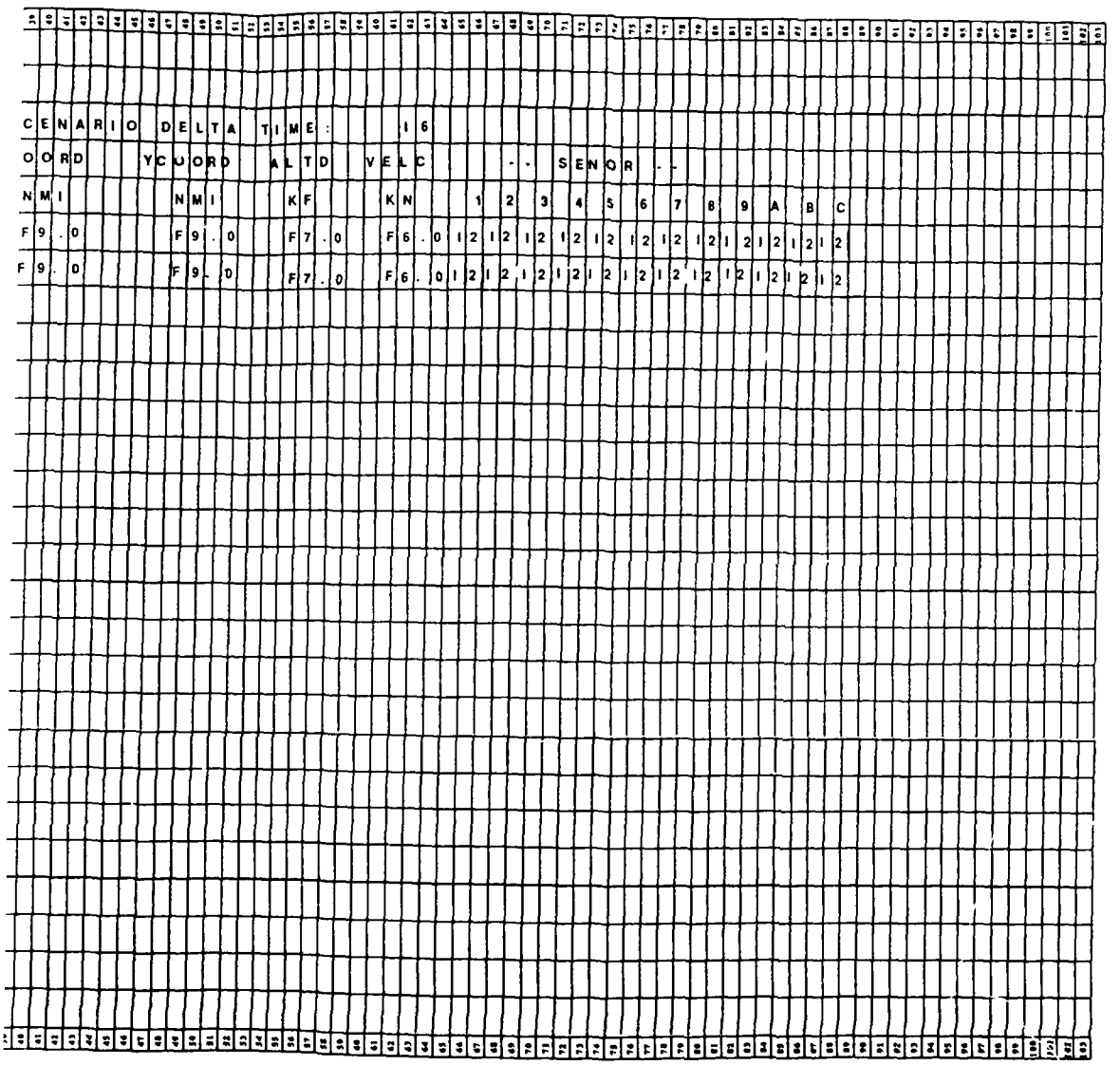

CENARIO DELTA TIME: 16
OORD YCOORD ALTD VELC -- SENOR --
NMI NMI KF KN 1 2 3 4 5 6 7 8 9 A B C
F9.0 F9.0 F7.0 F6.0 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2
F9.0 F9.0 F7.0 F6.0 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2

Figure 2.18-1

2.19 File 24 - Red Aircraft Formation Sub-Scenario

A labor saving file to permit the entry of additional Red aircraft which will maneuver in association with an aircraft listed in File 23, data unique to the wingman must be specified. The file layout is included as Figure 2.19-1. Three title lines and three column heading lines precede image A. Each wingman's flight plan is composed of a variable number of data lines, depending on the number of nodes or events defined for the aircraft. The following is a description of the data elements.

TABLE 24

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
FOR EACH RED AIRCRAFT:				
A	1-3	RED ID	I3	The Red ID number of the wingman in formation with the leader (leader ID below) aircraft (dimensionless, integer).
	4-8	LEAD ID	I4	The leader of the flight formation, must correspond to a RU value in File 23, Red Aircraft Scenario (dimensionless, integer).
	9-15	BEAR DEG	F7.0	Relative bearing of aircraft to leader, clockwise; must be between 90 and 270 degrees (degrees, real).
	16-20	DIST FT	F5.0	Distance of aircraft from the leader (feet, real)
	21-26	STEPUP FT	F6.0	Altitude difference from the leader (feet, real).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING TYPE	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A (cont)	27-31		I5	Red aircraft platform designation, must correspond to a PT value in File 16, Red Aircraft Characteristics (dimensionless, integer). Example values: 1 - Backfire; 2 - Blinder; 3 - Bear; 4 - Foxbat.
	32-34	T1	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 1, must correspond to BID value in File 21, Blue Units, (dimensionless, integer).
	35-37	T2	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 2 (dimensionless, integer).
	38-40	T3	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 3 (dimensionless, integer).
	41-43	T4	I3	Blue unit identification number of Blue ship targeted by Red aircraft missile 4 (dimensionless, integer).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A (cont)	44-47	NOD	I4	Node or event type (the nodes pertaining to jammer employment are furnished so that each wingman may have different victim Blue sensors; the nodes must be in the same order as for the leader with intermediate nodes removed) (dimensionless, integer) Nodes implemented: 5 - Radar jammer on; 6 - Radar jammer off. Not yet implemented: 7 - Communications jammer on; 8 - Communications jammer off.
FOR UP TO TWELVE TYPES OF TARGETED BLUE SENSORS:				
	50-51	1	I2	First type of Blue sensor targeted by the jammer, must correspond to an ST value in File 11, Blue Sensor Characteristics, (dimensionless, integer).
	52-53	2	I2	Second type of Blue sensor targeted by the jammer (dimensionless, integer).
	54-55	3	I2	Third type of Blue sensor targeted by tne jammer (dimensionless, integer).
	56-57	4	I2	Fourth type of Blue sensor targeted by the jammer (dimensionless, integer).
	58-59	5	I2	Fifth type of Blue sensor targeted by the jammer (dimensionless, integer).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A (cont)	60-61	6	I2	Sixth type of Blue sensor targeted by the jammer (dimensionless, integer).
	62-63	7	I2	Seventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	64-65	8	I2	Eighth type of Blue sensor targeted by the jammer (dimensionless, integer).
	66-67	9	I2	Ninth type of Blue sensor targeted by the jammer (dimensionless, integer).
	68-69	A	I2	Tenth type of Blue sensor targeted by the jammer (dimensionless, integer).
	70-71	B	I2	Eleventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	72-73	7	I2	Twelfth type of Blue sensor targeted by the jammer (dimensionless, integer).
	76-80	CHANGE FORM NODE	I5	Node at which a change of formation (bearing, distance, or stepup) is planned. This node is entered using LINE IMAGE C.
	81-85	LAST FORM NODE	I5	Last formation node; wingman will fly independently of the leader from this node on. Planed nodes after formation breakup are entered using LINE IMAGE B.

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B	44-47	NOD	I4	Node or event type (the nodes pertaining to jammer employment are furnished so that each wingman may have different victim Blue sensors; the nodes must be in the same order as for the leader with intermediate nodes removed) (dimensionless, integer). Nodes implemented: 5 - Radar jammer on; 6 - Radar jammer off. Not yet implemented: 7 - Communications jammer on; 8 - Communications jammer off.
FOR UP TO TWELVE TYPES OF TARGETED BLUE SENSORS:				
	50-51	1	I2	First type of Blue sensor targeted by the jammer, must correspond to an ST value in File 11, Blue Sensor Characteristics, (dimensionless, integer).
	52-53	2	I2	Second type of Blue sensor targeted by the jammer (dimensionless, integer).
	54-55	3	I2	Third type of Blue sensor targeted by the jammer (dimensionless, integer).
	56-57	4	I2	Fourth type of Blue sensor targeted by the jammer (dimensionless, integer).
	58-59	5	I2	Fifth type of Blue sensor targeted by the jammer (dimensionless, integer).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	60-61	6	I2	Sixth type of Blue sensor targeted by the jammer (dimensionless, integer).
	62-63	7	I2	Seventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	64-65	8	I2	Eighth type of Blue sensor targeted by the jammer (dimensionless, integer).
	66-67	9	I2	Ninth type of Blue sensor targeted by the jammer (dimensionless, integer).
	68-69	A	I2	Tenth type of Blue sensor targeted by the jammer (dimensionless, integer).
	70-71	B	I2	Eleventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	72-73	7	I2	Twelfth type of Blue sensor targeted by the jammer (dimensionless, integer).
C	1-3	RED ID	I3	The Red ID number of the wingman in formation with the leader (leader ID below) aircraft (dimensionless, integer).
	4-8	LEAD ID	I4	The leader of the flight formation, must correspond to a RU value in File 23, Red Aircraft Scenario (dimensionless, integer).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	9-15	BEAR DEG	F7.0	Relative bearing of aircraft to leader, clockwise; must be between 90 and 270 degrees (degrees, real).
	16-20	DIST FT	F5.0	Distance of aircraft from the leader (feet, real)
	21-26	STEPUP FT	F6.0	Altitude difference from the leader (feet, real).
	44-47	NOD	I4	Node or event type (the nodes pertaining to jammer employment are furnished so that each wingman may have different victim Blue sensors; the nodes must be in the same order as for the leader with intermediate nodes removed) (dimensionless, integer) Nodes implemented: 5 - Radar jammer on; 6 - Radar jammer off. Not yet implemented: 7 - Communications jammer on; 8 - Communications jammer off.
FOR UP TO TWELVE TYPES OF TARGETED BLUE SENSORS:				
	50-51	1	I2	First type of Blue sensor targeted by the jammer, must correspond to an ST value in File 11, Blue Sensor Characteristics, (dimensionless, integer).
	52-53	2	I2	Second type of Blue sensor targeted by the jammer (dimensionless, integer).
	54-55	3	I2	Third type of Blue sensor targeted by the jammer (dimensionless, integer).

TABLE 24 (continued)

FILE 24 - RED AIRCRAFT FORMATION SUB-SCENARIO:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	56-57	4	I2	Fourth type of Blue sensor targeted by the jammer (dimensionless, integer).
	58-59	5	I2	Fifth type of Blue sensor targeted by the jammer (dimensionless, integer).
	60-61	6	I2	Sixth type of Blue sensor targeted by the jammer (dimensionless, integer).
	62-63	7	I2	Seventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	64-65	8	I2	Eighth type of Blue sensor targeted by the jammer (dimensionless, integer).
	66-67	9	I2	Ninth type of Blue sensor targeted by the jammer (dimensionless, integer).
	68-69	A	I2	Tenth type of Blue sensor targeted by the jammer (dimensionless, integer).
	70-71	B	I2	Eleventh type of Blue sensor targeted by the jammer (dimensionless, integer).
	72-73	7	I2	Twelfth type of Blue sensor targeted by the jammer (dimensionless, integer).
	76-80	CHANGE FORM NODE	I5	Next node at which a change of formation (bearing, distance, or stepup) is planned. This node is entered using LINE IMAGE C.

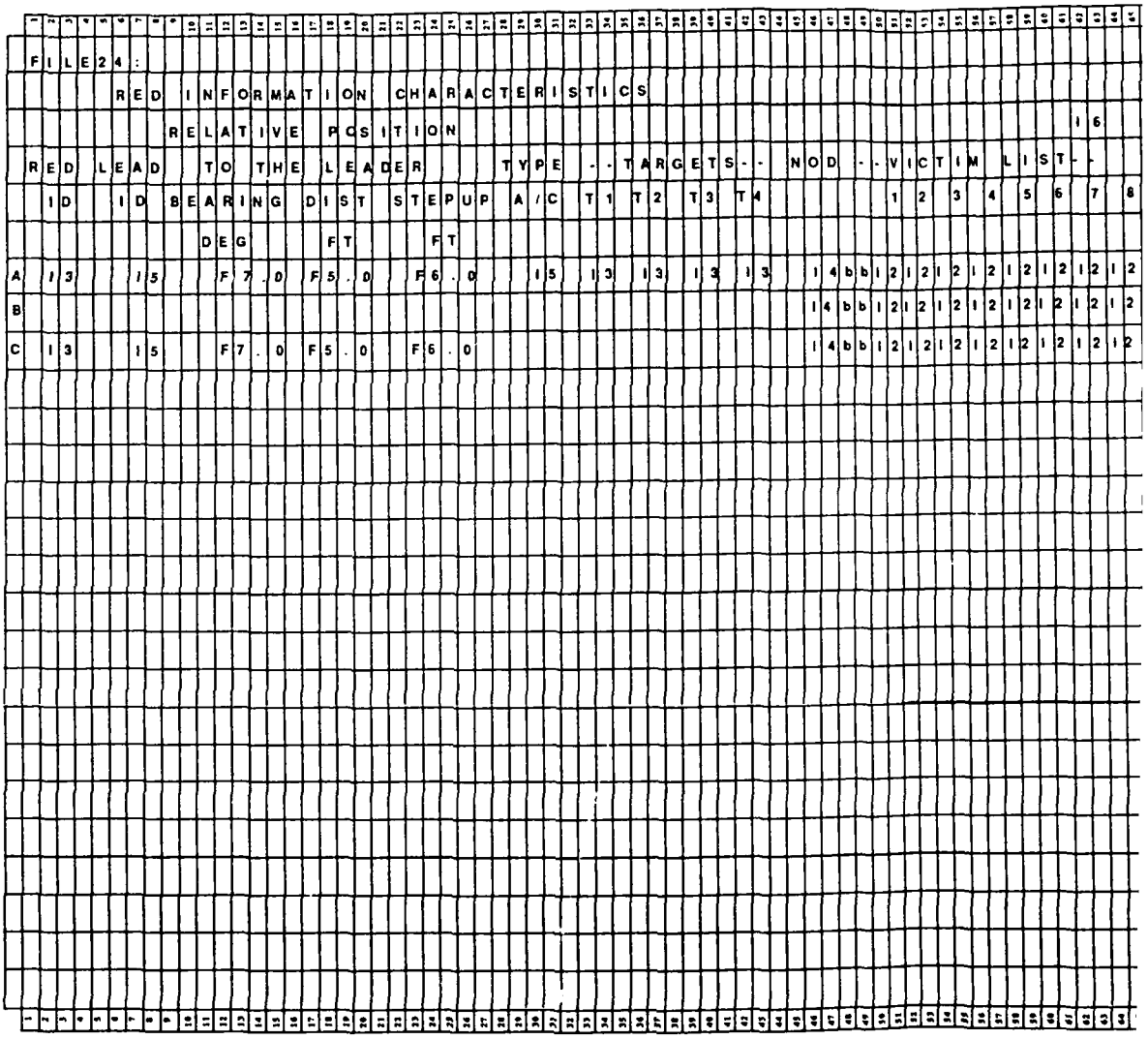

FILE24:
RED INFORMATION CHARACTERISTICS
RELATIVE POSITION
RED LEAD TO THE LEADER TYPE --TARGETS-- NOD --VICTIM LIST--
ID ID BEARING DIST STEPUP A/C T1 T2 T3 T4 1 2 3 4 5 6 7 8
DEG FT FT
A I3 I5 F7.0 F5.0 F6.0 I5 I3 I3 I3 I3 I4bbI2I2I2I2I2I2I2I2
B I4bbI2I2I2I2I2I2I2I2
C I3 I5 F7.0 F5.0 F6.0 I4bbI2I2I2I2I2I2I2I2

Figure 2.19-1

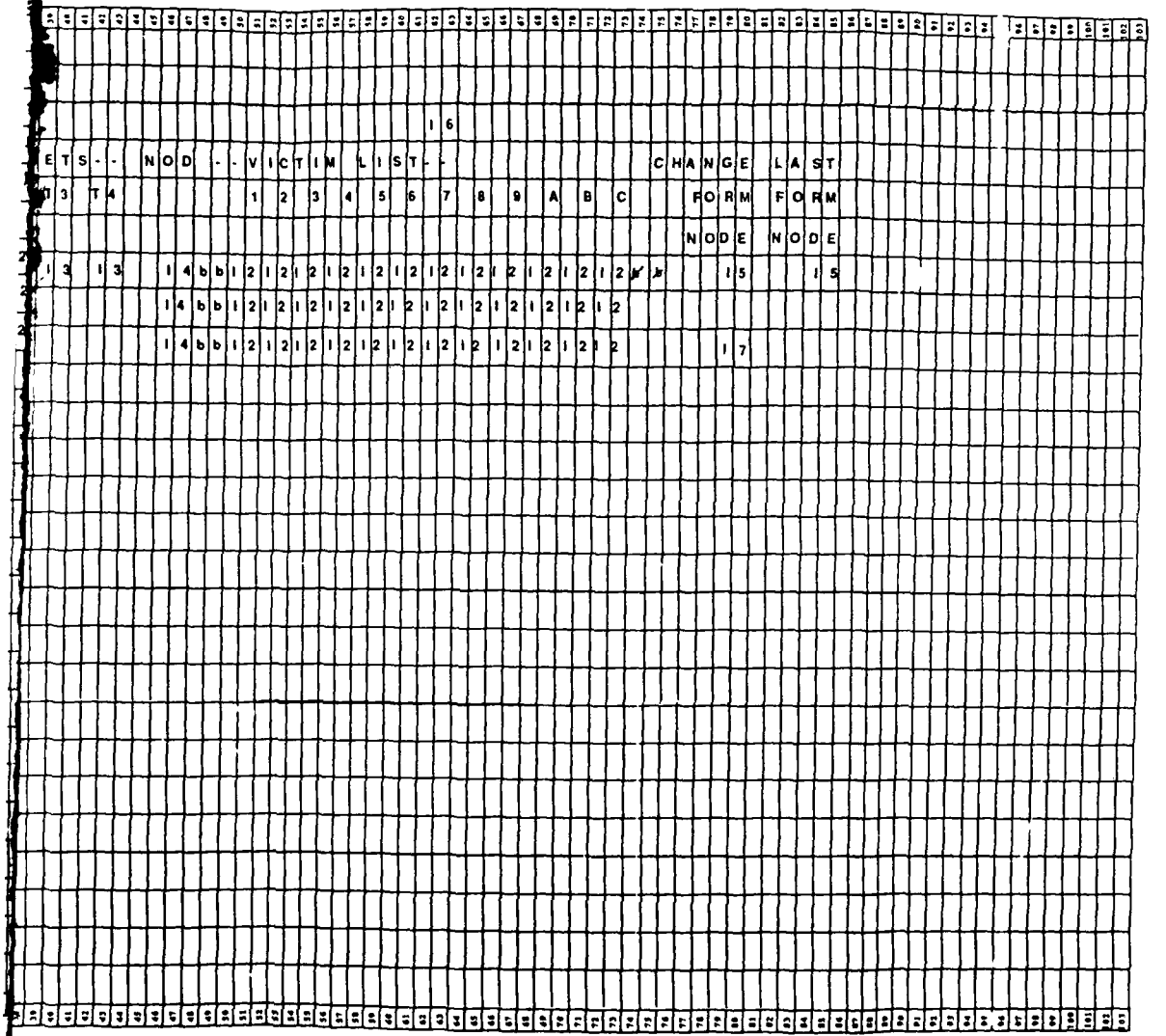

16
ETS-- NOD --VICTIM LIST--
CHANGE LAST
T3 T4
1 2 3 4 5 6 7 8 9 A B C
FORM FORM
NODE NODE
13 13
14bb12121212121212121212121212121212
15 15
14bb12121212121212121212121212121212
14bb12121212121212121212121212121212
17

Figure 2.19-1

2.20 File 25 - Red Surface and Sub-Surface Launched Missile Plan

The locations of the surface and subsurface platforms from which surface-to-surface missiles and subsurface-to-surface missiles will be launched, missile types, missile launch time, and missile targets are specified. The file layout is included as Figure 2.20-1. Three title lines precede line image A and two column heading lines precede line image B. Each of these descriptions is composed of a variable number of data lines, one for each SSM to be fired from that platform. The following is a description of the data elements.

TABLE 25

FILE 25 - RED SURFACE AND SUB-SURFACE LAUNCHED MISSILES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	46-49		I4	Number of Red Surface and Sub-Surface Launched Missiles (between zero and two hundred minus the number of Red aircraft).
FOR EACH RED SURFACE AND SUBSURFACE MISSILE LAUNCH PLATFORM:				
B	1-3	NS	I3	Number of the submarine or surface ships launching one or more Red anti-ship cruise missiles; value is read but not used by the program so any numbers may be used. (dimensionless, integer).
	4-13	XCOORD NMI	F10.0	Launch platform X-coordinate (nautical miles, real).
	14-23	YCOORD NMI	F10.0	Launch platform Y-coordinate (nautical miles, real).

FILE 25 - RED SURFACE AND SUB-SURFACE LAUNCHED MISSILES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	24-26	MC	I3	Total number of missiles to be fired from the platform, specifies the number of data lines for the platform (missiles, integer).
	27-29	MS	I3	Number of the missile to be launched, must be 1 on line image B (dimensionless, integer).
	30-32	MT	I3	Missile type for the first missile, must correspond to an MT value in File 17, Red Missile Characteristics, (dimensionless, integer). Example values: 3 - SS-N-7; 4 - SS-N-10.
	33-39	TLN MIN	F7.0	Time first missile is launched based on an initial time of one second (minutes, real).
	40-42	TG	I3	Blue unit identification number of Blue ship targeted by first missile, must correspond to a BID value in File 21, Blue Units, (dimensionless, integer).
FOR EACH SUCCESSIVE MISSILE FIRED FROM THE PLATFORM:				
C	27-29	MS	I3	Number of the missile to be launched numbered consecutively from two to the MC value on line image B (dimensionless, integer).

FILE 25 - RED SURFACE AND SUB-SURFACE LAUNCHED MISSILES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	30-32	MT	I3	Missile type for this missile, Must correspond to an MT value in File 17, Red Missile Characteristics, (dimensionless, integer). Example values: 3 - SS-N-7; 4 - SS-N-10.
	33-39	TLN MIN	F7.0	Time this missile is launched based on an initial time of one second (minutes, real).
	40-42	TG	I3	Blue unit identification number of Blue ship targeted by this missile, must correspond to a BID value in File 21, Blue Units, (dimensionless, integer).

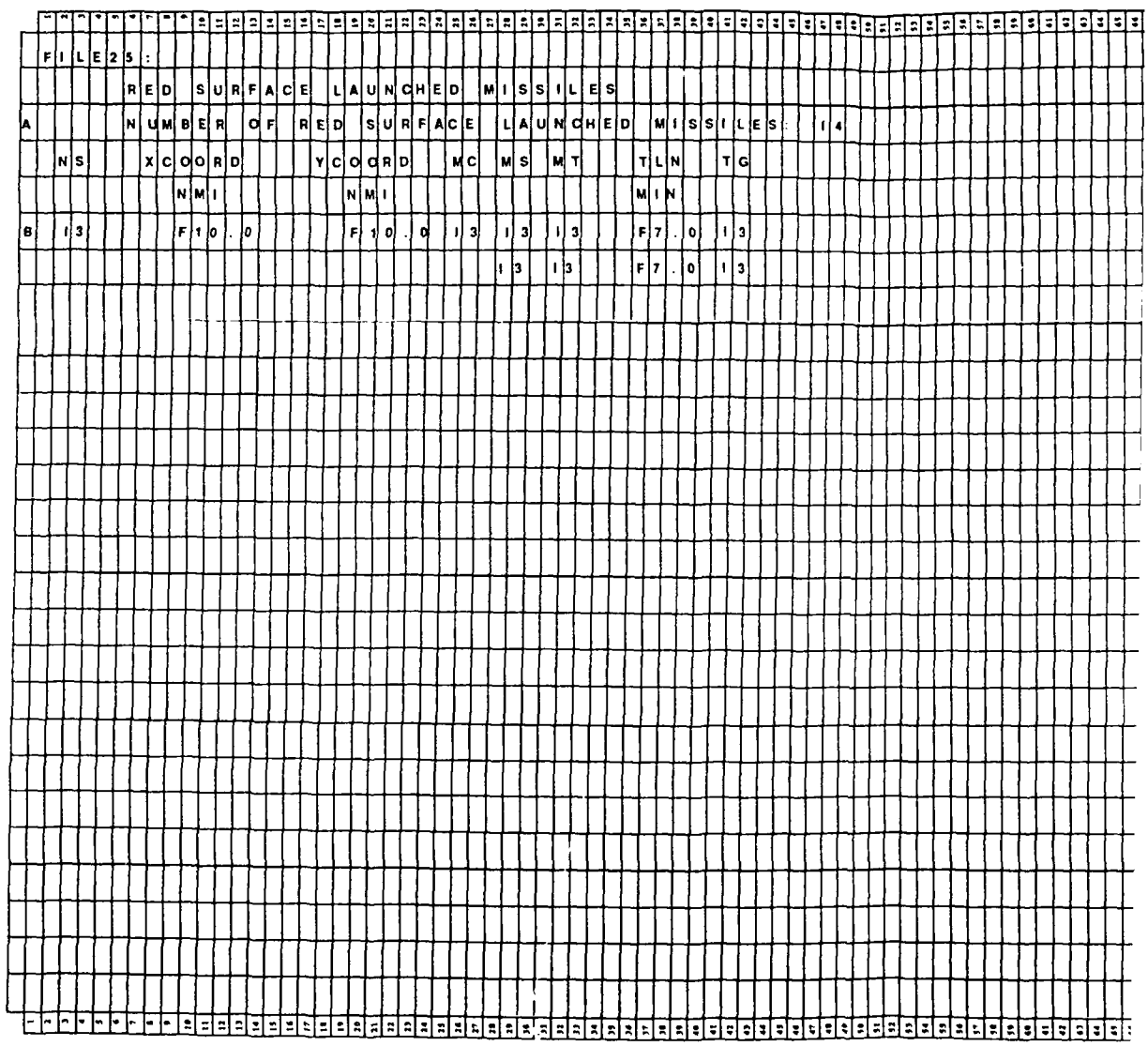

FILE25:
RED SURFACE LAUNCHED MISSILES
A NUMBER OF RED SURFACE LAUNCHED MISSILES: 14
NS XCOORD YCOORD MC MS MT TLN TG
NMI NMI MIN
B 13 F10.0 F10.0 13 13 13 F7.0 13
13 13 F7.0 13

Figure 2.20-1

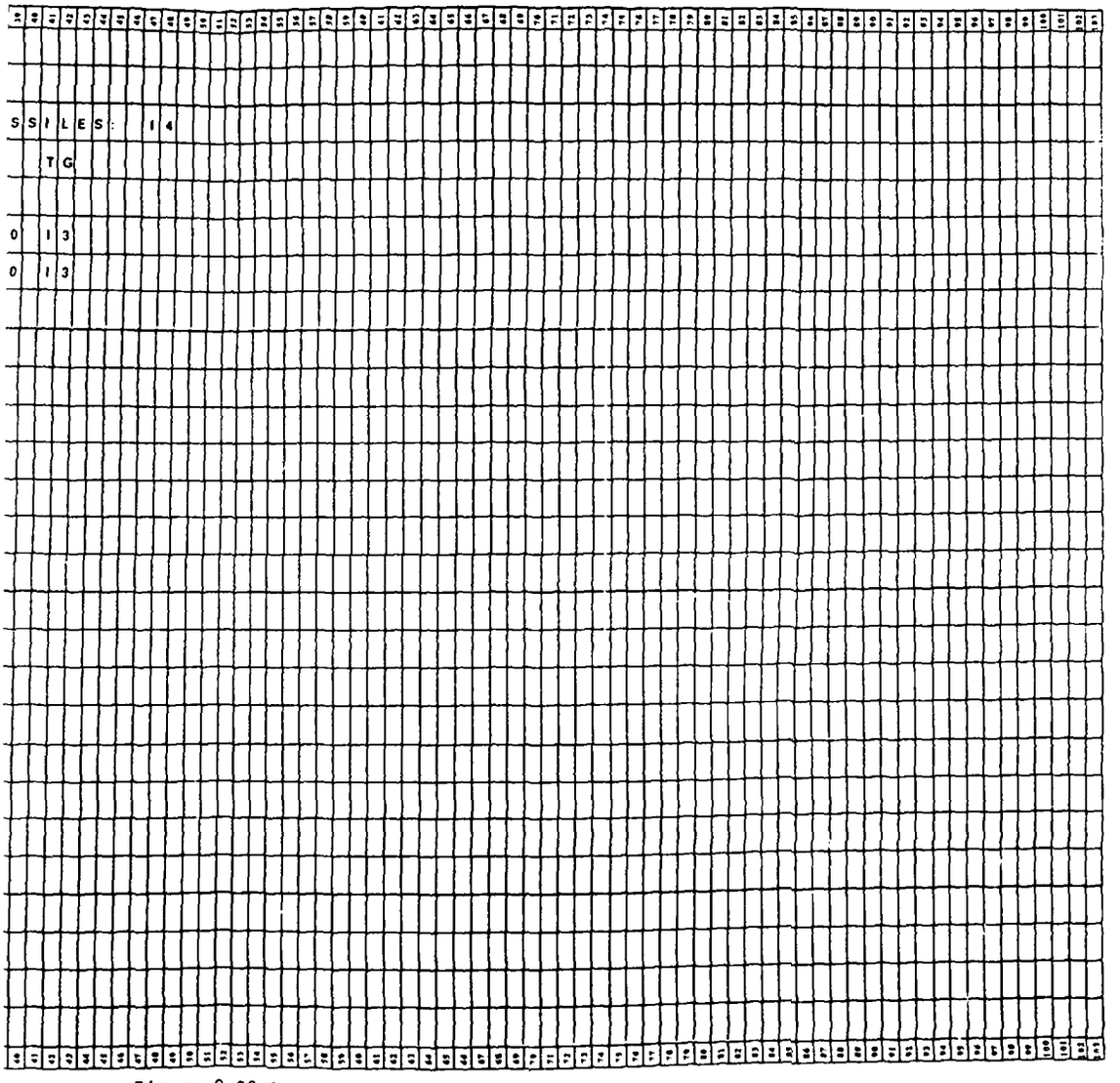


Figure 2.20-1

2.21 File 28 - Blue Jammer Characteristics

The characterization of Blue Jammers: effective radiated power; maximum jamming bandwidth; and, minimum jamming bandwidth for Blue jammers are specified by type. The file layout is included as Figure 2.21-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines representing different types of jammers. The following is a description of the data elements.

TABLE 28

FILE 28 - BLUE JAMMER CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	34-35		I2	Number of Blue jammer types: (between zero and eight).
FOR EACH BLUE JAMMER TYPE:				
B	1-2	JT	I2	Number (from 1 to 8) corresponding to a particular type of Blue jammer (dimensionless, integer).
	3-9	POW WATTS	F7.0	Total effective radiated power (watts, real). No commas.
	10-14	MXW MHZ	F5.0	Maximum jamming bandwidth (megahertz, real).
	15-18	MNW MHZ	F4.0	Minimum jamming bandwidth (megahertz, real).

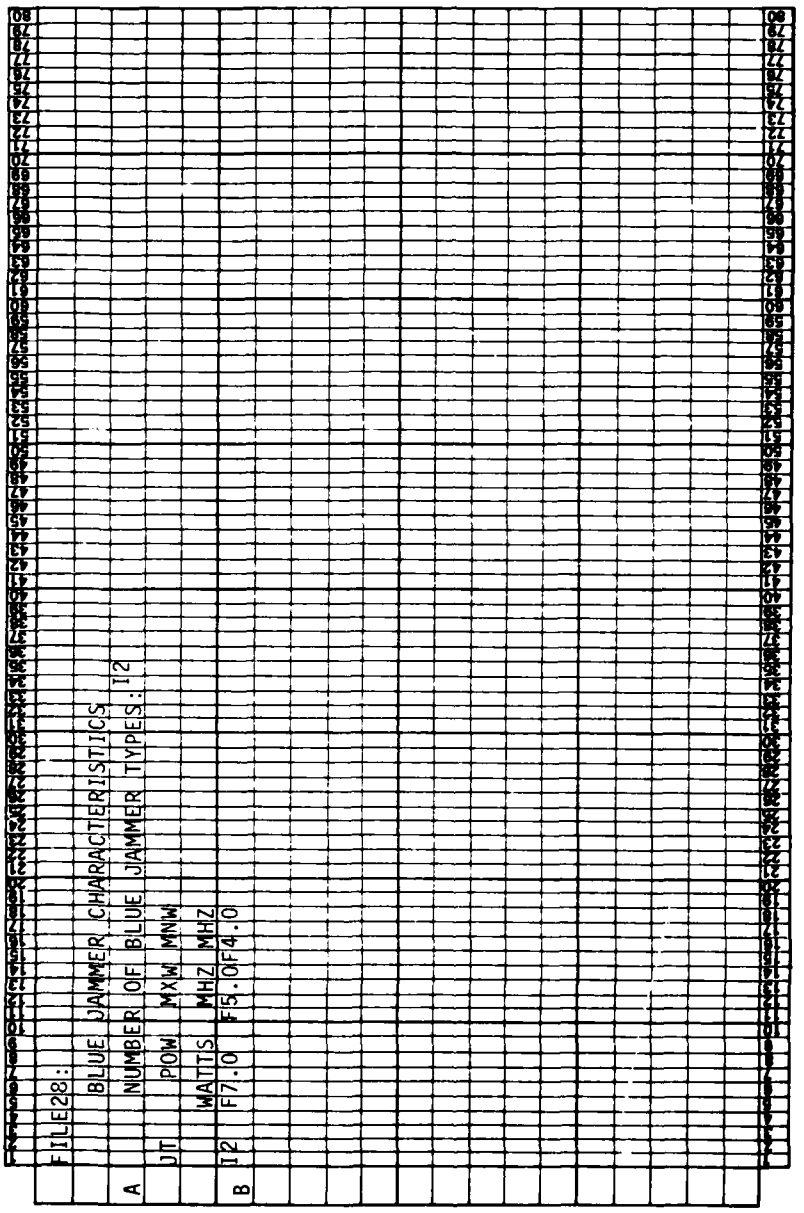

FILE28:
BLUE JAMMER CHARACTERISTICS
A
NUMBER OF BLUE JAMMER TYPES: I2
UT
POW MXW MNW
WATTS MHZ MHZ
B
I2 F7.0 F5.0 F4.0

Figure 2.21-1

2.22 File 29 - Miscellaneous

Values are specified for twenty-five simple variables which characterize command, control and communications parameters, four complex variables which characterize early warning aircraft tactical response, seven complex variables which are used for fighter management, and one complex variable used for nuclear weapons employment in the area defenses. The file layout is included as Figure 2.22-1. Two title lines precede the lines of data. The first item on each line is a title for a variable. The following item is the value for the variable for simple variables. For complex variables relating to control of early warning aircraft, the title of the variable is followed by up to five data values. For other complex variables, the title of the variable is followed by up to ten values for the variable. The order of the variables may not be changed without modifying the program. The titles are read by the program, but not processed. The following is a description of the data elements.

TABLE 29

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	11-20	COMTDS	I10	Message delay time when both sending and receiving units have operational Tactical Data System, includes time for receiver to comprehend message (seconds, integer).
B	11-20	COMVCE	I10	Message delay time when sending or receiving unit does not have operational TDS, includes reader comprehension time (seconds, integer).
C	11-20	NTDLY	F10.0	Time for a Blue ship or fighter (VF) to decide action to take after start of tracking new target (minutes, real).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
D	11-20	NUC	I10	Nuclear Release for Force (dimensionless, integer): 1 - Release 0 - No release
E	11-20	DDESP	F10.0	Distance from the Keepout Range for use of Nuclear AIM (nautical miles, real). Used only for Nuclear AIM cases.
F	11-20	MININT	F10.0	Minimum distance from force center that VF may fly on an intercept to avoid SAM danger zones (nautical miles, real).
G	11-20	TANKER	F10.0	Total fuel available on tankers (pounds, real).
H	11-20	WAITC	F10.0	Time Command Center awaits CAP confirmation of a Red target assignment before reassigning target to a different unit (minutes, real).
I	11-20	WAITL	F10.0	Time Command Center awaits DLI confirmation of a Red target assignment before reassigning target to a different unit (minutes, real).
J	11-20	WAITF	F10.0	Time fighter awaits response from controller on self assign request before acting (minutes, real).
K	11-20	TMARGL	F10.0	Time margin for DLI launch (minutes, real).
L	11-20	MNDOGT	F10.0	Mean duration of dogfight (minutes, real).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
M	11-20	SDDOGT	F10.0	Standard deviation of duration of dogfight (minutes, real).
N	11-20	DISTT2	F10.0	"Good Enough" distance for secondary target assignment, used to shortcut search for an optimal secondary target (nautical miles,real).
O	11-20	NAIMKR	F10.0	Presumed Nuclear AIM kill radius for multiple kill criteria. Used only for Nuclear AIM cases (nautical miles, real).
P	11-20	NUCNO	I10	Threshold number of targets within NAIMKR distance of the primary target to cause selection for Nuclear AIM. Used only for Nuclear AIM cases (targets, integer).
Q	11-20	ISALVO	I10	Fighter (VF) launch strategy for type 2 missiles: 1 - launch salvo of two missiles; 0 - launch single missile (dimensionless, integer).
R	11-20	JSALVO	I10	Fighter (VF) launch strategy for type 3 missiles: 1 - launch salvo of two missiles; 0 - launch single missile (dimensionless, integer).
S	11-20	CDOCT	I10	SAM coordination level: 1 - Command Center coordination; 2 - Ship sectors; 3 - No coordination (dimensionless, integer).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
T	11-20	TDUO	I10	Time between SAM launches when salvo is used (seconds, integer).
U	11-20	TMINS	I10	Time threshold at which Red missiles about to enter a ship's SAM envelope are considered to be in the envelope for purposes of Command Center target assignment (seconds, integer).
V	11-20	TEVALS	I10	Time to evaluate SAM hit or miss (seconds, integer).
W	11-20	CCBUID	I10	Blue unit identification number of the Command Center (dimensionless, integer).
X	11-20	TLATE	F10.0	Minimum time for rescheduling or cancelling VF launch (minutes, real).
Y	11-17	LATRNG	F7.0	The lateral range (the average number of targets not detected with a closest point of approach less than the lateral range is equal to the number with a closest point of approach greater than the lateral range) for the first type of early warning aircraft (nautical miles).
	18-24	LATRNG	F7.0	The lateral range for the second type of early warning aircraft (nautical miles).
	25-31	LATRNG	F7.0	The lateral range for the third type of early warning aircraft (nautical miles).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
Y (cont)	32-38	LATRNG	F7.0	The lateral range for the fourth type of early warning aircraft (nautical miles).
	39-45	LATRNG	F7.0	The lateral range for the fifth type of early warning aircraft (nautical miles).
Z	11-17	STADST	F7.0	The range from force center to station early warning aircraft of the first type (nautical miles).
	18-24	STADST	F7.0	The range from force center to station early warning aircraft of the second type (nautical miles).
	25-31	STADST	F7.0	The range from force center to station early warning aircraft of the third type (nautical miles).
	32-38	STADST	F7.0	The range from force center to station early warning aircraft of the fourth type (nautical miles).
	39-45	STADST	F7.0	The range from force center to station early warning aircraft of the fifth type (nautical miles).
AA	11-17	STAALT(1)	F7.0	The normal search altitude for early warning aircraft of the first type (nautical miles).
	18-24	STAALT(1)	F7.0	The normal search altitude for early warning aircraft of the second type (nautical miles).
	25-31	STAALT(1)	F7.0	The normal search altitude for early warning aircraft of the third type (nautical miles).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
AA (cont)	32-38	STAALT(1)	F7.0	The normal search altitude for early warning aircraft of the fourth type (nautical miles).
	39-45	STAALT(1)	F7.0	The normal search altitude for early warning aircraft of the fifth type (nautical miles).
BB	11-17	STAALT(2)	F7.0	The minimum search altitude for early warning aircraft of the first type (nautical miles). NOTE: This variable is not currently used.
	18-24	STAALT(2)	F7.0	The minimum search altitude for early warning aircraft of the second type (nautical miles). NOTE: This variable is not currently used.
	25-31	STAALT(2)	F7.0	The minimum search altitude for early warning aircraft of the third type (nautical miles). NOTE: This variable is not currently used.
	32-38	STAALT(2)	F7.0	The minimum search altitude for early warning aircraft of the fourth type (nautical miles). NOTE: This variable is not currently used.
	39-45	STAALT(2)	F7.0	The minimum search altitude for early warning aircraft of the fifth type (nautical miles). NOTE: This variable is not currently used.

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
CC	11-20	ESM	I10	TDS automatically updates ESM bearings (jamming strobes) 1 - automatic update 0 - contact and lost contact reports
DD	11-17	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the first type (degrees).
	18-24	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the second type (degrees).
	25-31	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the third type (degrees).
	32-38	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the fourth type (degrees).
	39-45	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the fifth type (degrees).
	46-52	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the sixth type (degrees).
	53-59	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the seventh type (degrees).
	60-66	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the eigthth type (degrees).
	67-73	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the ninth type (degrees).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
DD (cont)	74-80	ANGOFF	F7.0	The angle separation from jammer aircraft for fighter aircraft of the tenth type (degrees).
EE	11-17	STARNG	F7.0	The distance from force center to station fighter aircraft of the first type against jammers (nautical miles).
	18-24	STARNG	F7.0	The distance from force center to station fighter aircraft of the second type against jammers (nautical miles).
	25-31	STARNG	F7.0	The distance from force center to station fighter aircraft of the third type against jammers (nautical miles).
	32-38	STARNG	F7.0	The distance from force center to station fighter aircraft of the fourth type against jammers (nautical miles).
	39-45	STARNG	F7.0	The distance from force center to station fighter aircraft of the fifth type against jammers (nautical miles).
	46-52	STARNG	F7.0	The distance from force center to station fighter aircraft of the sixth type against jammers (nautical miles).
	53-59	STARNG	F7.0	The distance from force center to station fighter aircraft of the seventh type against jammers (nautical miles).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
AE (cont)	60-66	STARNG	F7.0	The distance from force center to station fighter aircraft of the eighth type against jammers (nautical miles).
	67-73	STARNG	F7.0	The distance from force center to station fighter aircraft of the ninth type against jammers (nautical miles).
	74-80	STARNG	F7.0	The distance from force center to station fighter aircraft of the tenth type against jammers (nautical miles).
FF	11-17	STAANG	F7.0	The altitude at which to station fighter aircraft of the first type against jammers (kilofeet).
	18-24	STAANG	F7.0	The altitude at which to station fighter aircraft of the second type against jammers (kilofeet).
	25-31	STAANG	F7.0	The altitude at which to station fighter aircraft of the third type against jammers (kilofeet).
	32-38	STAANG	F7.0	The altitude at which to station fighter aircraft of the fourth type against jammers (kilofeet).
	39-45	STAANG	F7.0	The altitude at which to station fighter aircraft of the fifth type against jammers (kilofeet).
	46-52	STAANG	F7.0	The altitude at which to station fighter aircraft of the sixth type against jammers (kilofeet).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
FF (cont)	53-59	STAANG	F7.0	The altitude at which to station fighter aircraft of the seventh type against jammers (kilofeet).
	60-66	STAANG	F7.0	The altitude at which to station fighter aircraft of the eighth type against jammers (kilofeet).
	67-73	STAANG	F7.0	The altitude at which to station fighter aircraft of the ninth type against jammers (kilofeet).
	74-80	STAANG	F7.0	The altitude at which to station fighter aircraft of the tenth type against jammers (kilofeet).
GG	11-17	STASPD	A7	The speed used by fighter aircraft of the first type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	18-24	STASPD	A7	The speed used by fighter aircraft of the second type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	25-31	STASPD	A7	The speed used by fighter aircraft of the third type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	32-38	STASPD	A7	The speed used by fighter aircraft of the fourth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	39-45	STASPD	A7	The speed used by fighter aircraft of the fifth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
GG (cont)	46-52	STASPD	A7	The speed used by fighter aircraft of the sixth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	53-59	STASPD	A7	The speed used by fighter aircraft of the seventh type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	60-66	STASPD	A7	The speed used by fighter aircraft of the eighth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	67-73	STASPD	A7	The speed used by fighter aircraft of the ninth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
	74-80	STASPD	A7	The speed used by fighter aircraft of the tenth type in stationing against jammers (ENDURE, RANGE, BUSTER, GATE).
HH	11-17	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the first type after takeoff on the way to station (pounds).
	18-24	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the second type after takeoff on the way to station (pounds).
	25-31	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the third type after takeoff on the way to station (pounds).
	32-38	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the fourth type after takeoff on the way to station (pounds).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
HH (cont)	39-45	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the fifth type after takeoff on the way to station (pounds).
	46-52	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the sixth type after takeoff on the way to station (pounds).
	53-59	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the seventh type after takeoff on the way to station (pounds).
	60-66	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the eighth type after takeoff on the way to station (pounds).
	67-73	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the ninth type after takeoff on the way to station (pounds).
	74-80	PTOGAS	F7.0	The fuel furnished to fighter aircraft of the tenth type after takeoff on the way to station (pounds).
II	11-17	PTOFTM	F7.0	The time to refuel fighter aircraft of the first type after takeoff on the way to station (minutes).
	18-24	PTOFTM	F7.0	The time to refuel fighter aircraft of the second type after takeoff on the way to station (minutes).
	25-31	PTOFTM	F7.0	The time to refuel fighter aircraft of the third type after takeoff on the way to station (minutes).
	32-38	PTOFTM	F7.0	The time to refuel fighter aircraft of the fourth type after takeoff on the way to station (minutes).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
II (cont)	39-45	PTOFTM	F7.0	The time to refuel fighter aircraft of the fifth type after takeoff on the way to station (minutes).
	46-52	PTOFTM	F7.0	The time to refuel fighter aircraft of the sixth type after takeoff on the way to station (minutes).
	53-59	PTOFTM	F7.0	The time to refuel fighter aircraft of the seventh type after takeoff on the way to station (minutes).
	60-66	PTOFTM	F7.0	The time to refuel fighter aircraft of the eighth type after takeoff on the way to station (minutes).
	67-73	PTOFTM	F7.0	The time to refuel fighter aircraft of the ninth type after takeoff on the way to station (minutes).
	74-80	PTOFTM	F7.0	The time to refuel fighter aircraft of the tenth type after takeoff on the way to station (minutes).
JJ	11-17	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the first type (pounds).
	18-24	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the second type (pounds).
	25-31	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the third type (pounds).
	32-38	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the fourth type (pounds).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
JJ (CONT)	39-45	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the fifth type (pounds).
	46-52	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the sixth type (pounds).
	53-59	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the seventh type (pounds).
	60-66	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the eighth type (pounds).
	67-73	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the ninth type (pounds).
	74-80	PLNGAS	F7.0	Command center planning fuel for fighter aircraft of the tenth type (pounds).
KK	11-20	NKORNGA	F7.0	The aircraft nuclear keepout range used with SAM firing policies 7 and 8 (nautical miles).
LL	11-17	NKORNG	F7.0	The array of missile nuclear keepout range used with SAM firing policies 7 and 8 (nautical miles).
	18-24	NKORNG	F7.0	Second range (nautical miles).
	25-31	NKORNG	F7.0	Third range (nautical miles).
	32-38	NKORNG	F7.0	Fourth range (nautical miles).
	39-45	NKORNG	F7.0	Fifth range (nautical miles).

TABLE 29 (continued)

FILE 29 - MISCELLANEOUS DATA:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	ROW HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
LL (cont)	46-52	NKORNG	F7.0	Sixth range (nautical miles).
	53-59	NKORNG	F7.0	Seventh range (nautical miles).
	60-66	NKORNG	F7.0	Eighth range (nautical miles).
	67-73	NKORNG	F7.0	Ninth range (nautical miles).
	74-80	NKORNG	F7.0	Tenth range (nautical miles).

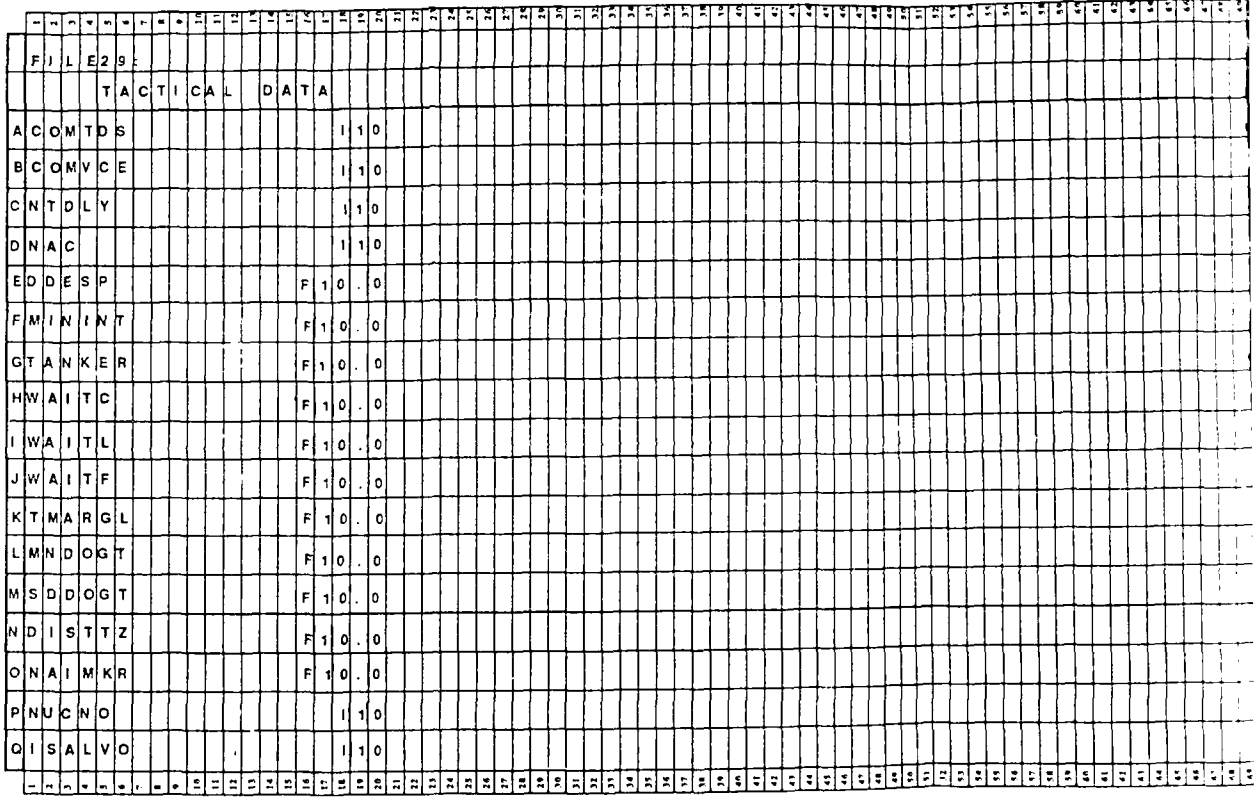

FILE29:
TACTICAL DATA
ACOMTDS I10
BCOMVCE I10
CNTDLY I10
DNAC I10
EDDESP F10.0
FMININT F10.0
GTANKER F10.0
HWAITC F10.0
IWAITL F10.0
JWAITF F10.0
KTMARGL F10.0
LMNDOGT F10.0
MSDDOGT F10.0
NDISTTZ F10.0
ONAIMKR F10.0
PNUCNO I10
QISALVO I10

Figure 2.22-1

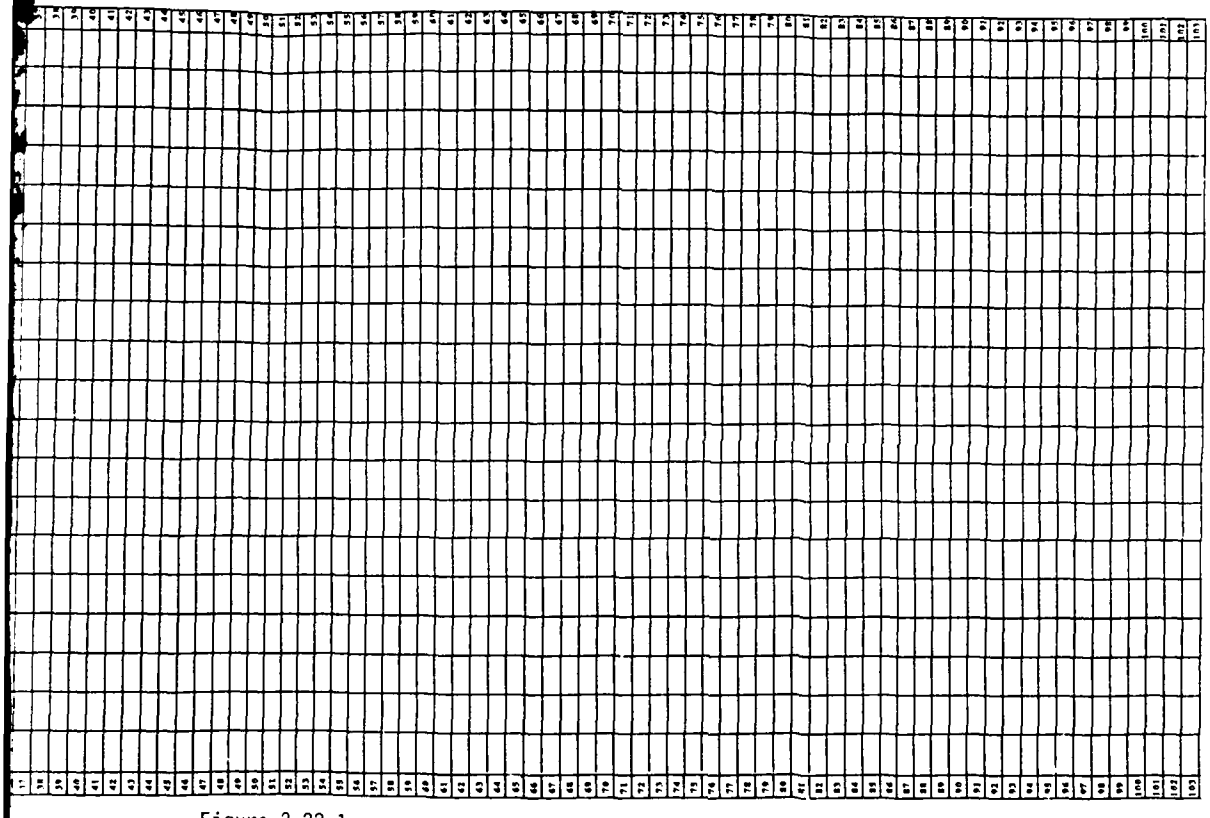


Figure 2.22-1

FILE 29 (Continued)

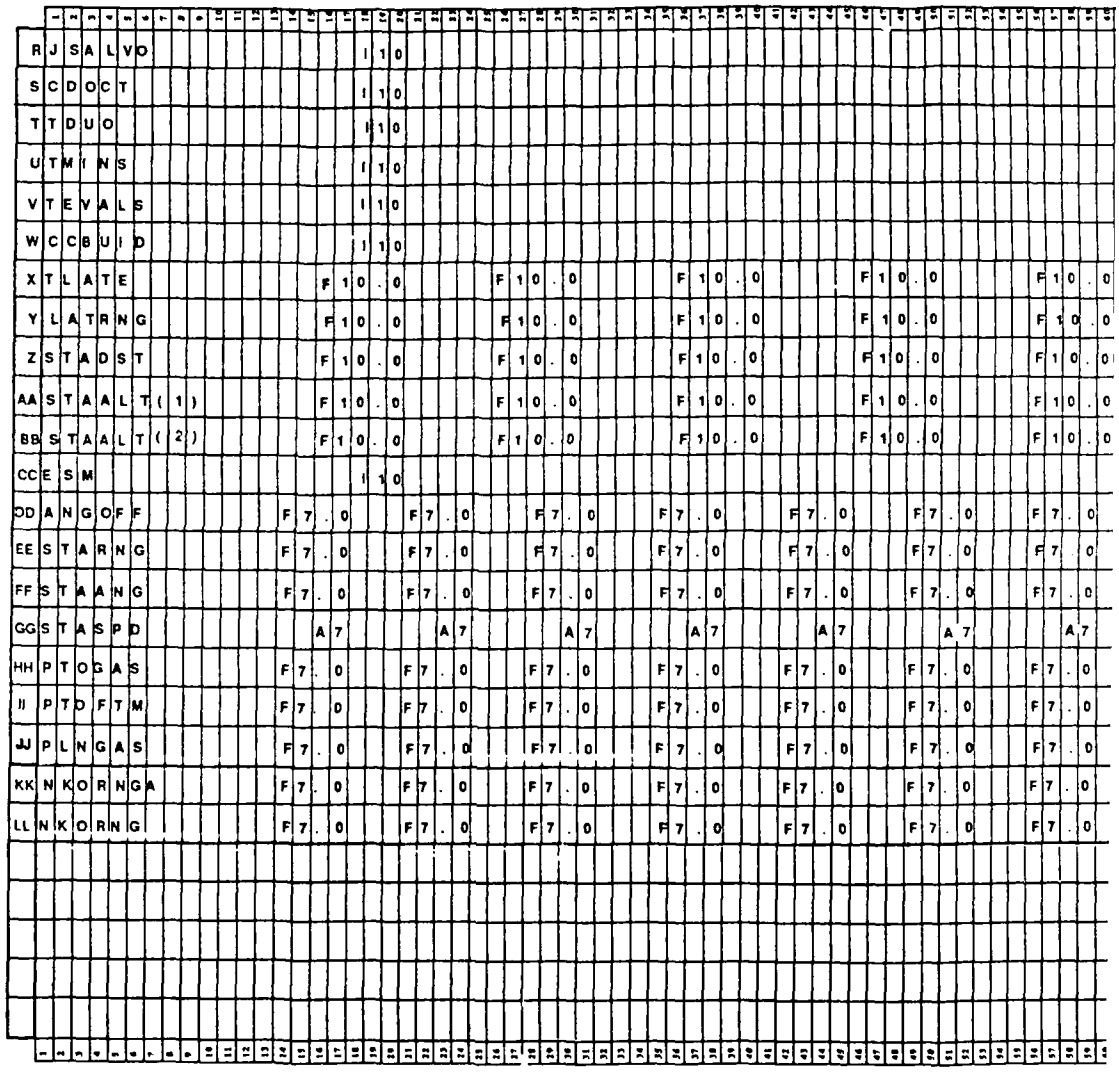


Figure 2.22-1
(Cont'd.)

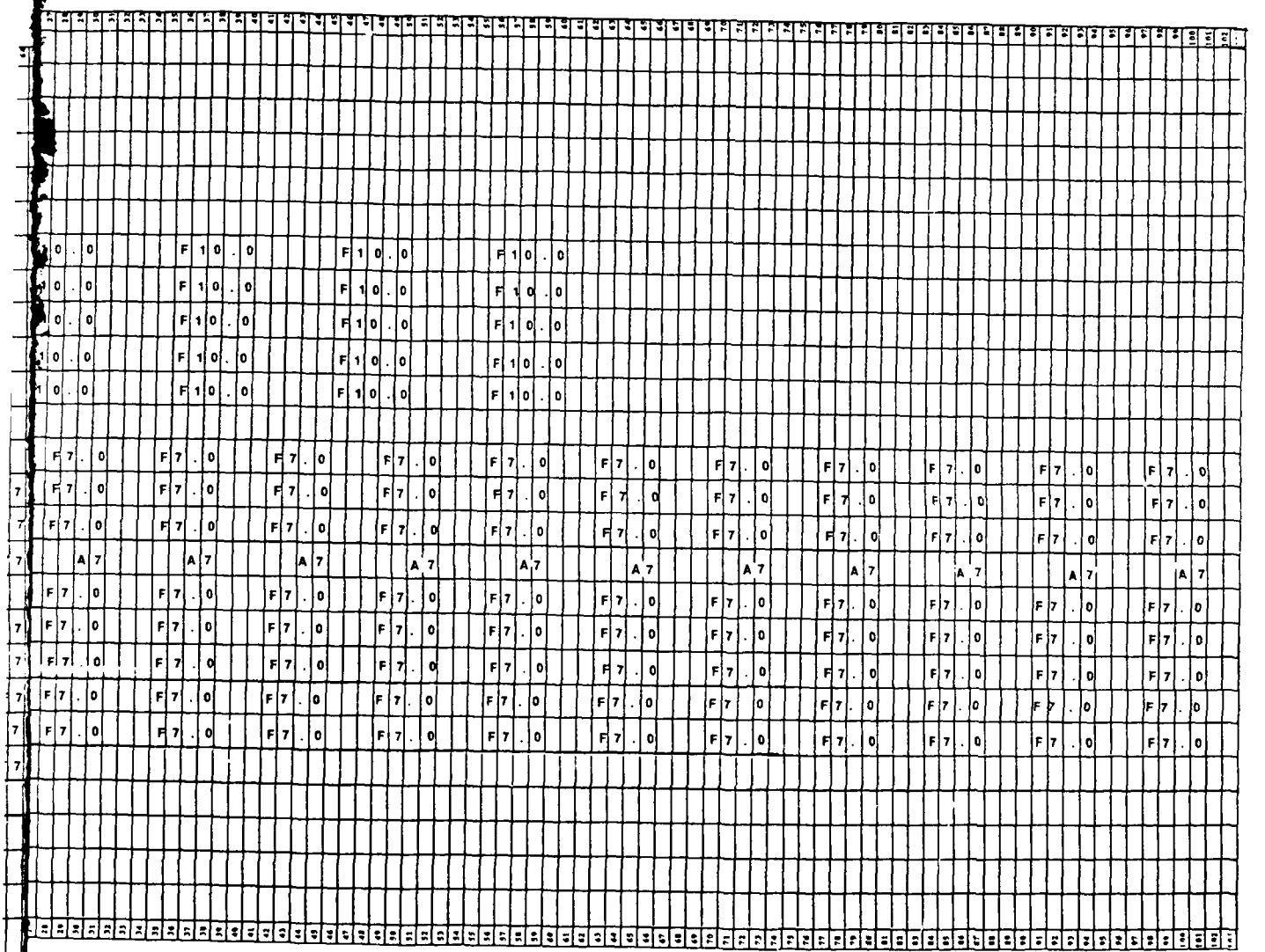


Figure 2.22-1
(Cont'd.)

2.23 File 30 - Blue Active Jamming Plan

The intended victim sensors for the BLUE ECM plan are specified by BLUE unit. The file layout is included as Figure 2.23-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines representing different jamming types. The following is a description of the data elements.

TABLE 30

FILE 30 - BLUE ACTIVE JAMMING PLAN:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	28-29		I2	Number of Active Jammers (between one and 127) (dimensionless, integer).
FOR EACH AJP TYPE:				
B	1-3	BLN	I3	Blue unit identification corresponds to BID in File 22, Blue Units (dimensionless, integer).
	4-6	NO VIC	I3	Number of victims for a particular Blue unit number (dimensionless, integer).
	7-9	VIC NUM	I3	Red sensor number for the first victim (dimensionless, integer).
	10-12			as in 7-9 (up to 25 Red sensor victim numbers).
	.			.
	.			.
	.			.
	64-66			

TABLE 30 (continued)

FILE 30 - BLUE ACTIVE JAMMING PLAN:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C	7-9	VIC NUM	I3	Victim number for the number of victims(up to 25 victim numbers).
	10-12			
	.			
	.			
	19-21			

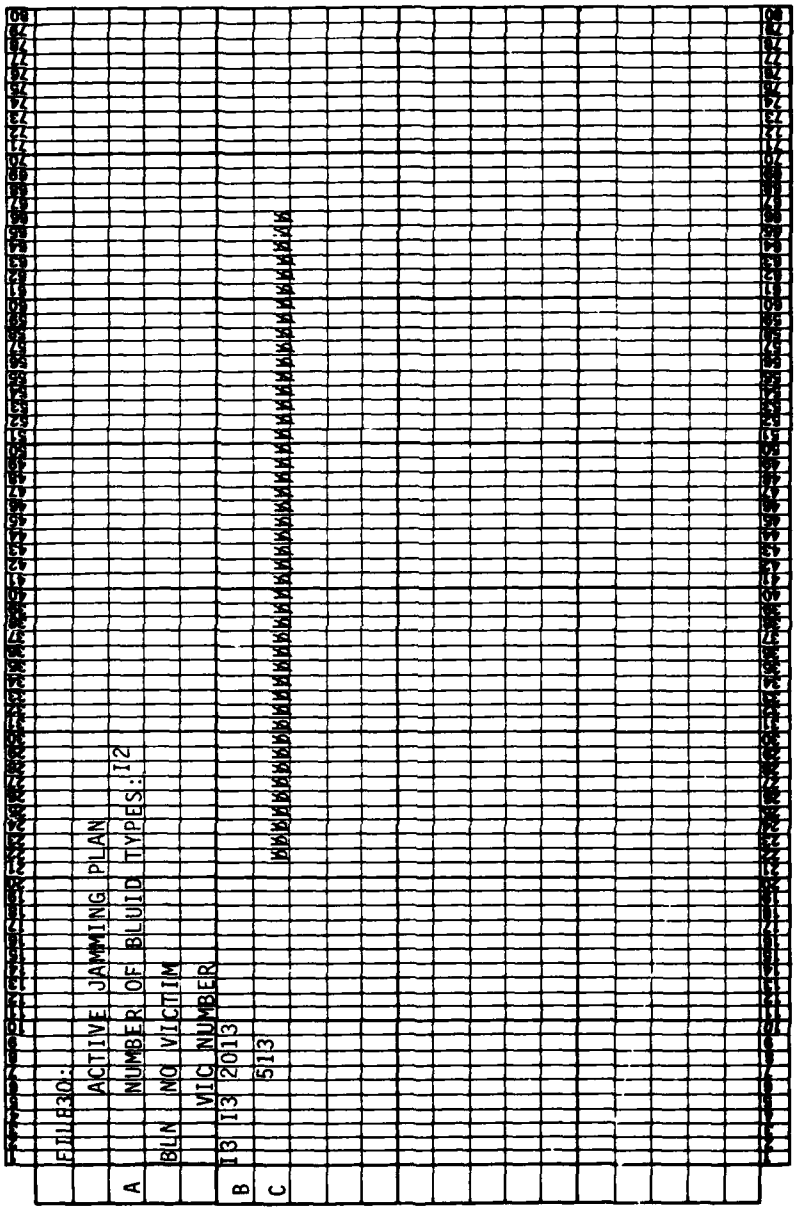

FILE30:
ACTIVE JAMMING PLAN
A NUMBER OF BLUID TYPES: I2
BLN NO VICTIM
VIC NUMBER
B I3 I3 2013
C 513

Figure 2.23-1

2.24 File 31 - Red Sensor Characteristics

The characterization of Red sensors: detection performance in a clear environment; parameters to calculate detection vulnerability to jamming; sector limits of the sensor; and, parameters of the detection delay function for Red radars are specified by sensor type. The file layout is included as Figure 2.24-1. Two title lines precede line image A and three column heading lines precede line image B, representing different types of sensors. The following is a description of the data elements.

TABLE 31

FILE 31 - RED SENSOR CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	29-30		I2	Number of sensor types (between zero and twenty).
FOR EACH SENSOR TYPE:				
B	1-2	ST	I2	Number (from 1 to 20) corresponding to a type of search radar Examples: 1 - DOWNBEAT; 2 - PUFFBALL (dimensionless, integer).
	3-7	RNGE BETA NMI	F5.0	Range beta: nominal, clear-environment detection range for a one square meter target (nautical miles, real).
	8-12	RNGE ALPH NMI	F5.0	Range alpha: burnthrough range for a one square meter target that is self-screen jamming at an effective radiated power of one watt per megahertz (nautical miles, real).
	13-17	RNGE INST NMI	F5.0	Instrumented range of the radar (nautical miles, real).

TABLE 31 (continue)

FILE 31 - RED SENSOR CHARACTERISTICS:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	18-23	JAM BW MHZ	F6.0	Effective bandwidth for a spot noise jammer (megahertz, real).
	24-30	SIDE LOBES SUP/CNL	F5.0	Side lobe jammer suppression channel (channel, real).
	31-35	SIDE LOBES DB	F5.0	Average reception side lobe level, below main beam (decibels, real).
	36-40	MAIN LOBE DEG	F5.0	Width of the main lobe of the radar from centerline, used for jamming vulnerability (degrees, real).
	41-45	SCTR ANGL DEG	F5.0	Search sector of radar, includes angle covered by steerable sector limits (degrees, real).
	DETDLYL:			
	46-50	TBASE	F5.0	Base time of delay (seconds, real).
	51-55	N2	F5.0	Delay time multiplier (seconds, real).
	56-60	ADD	F5.0	Alerted detection delay time (seconds, real).

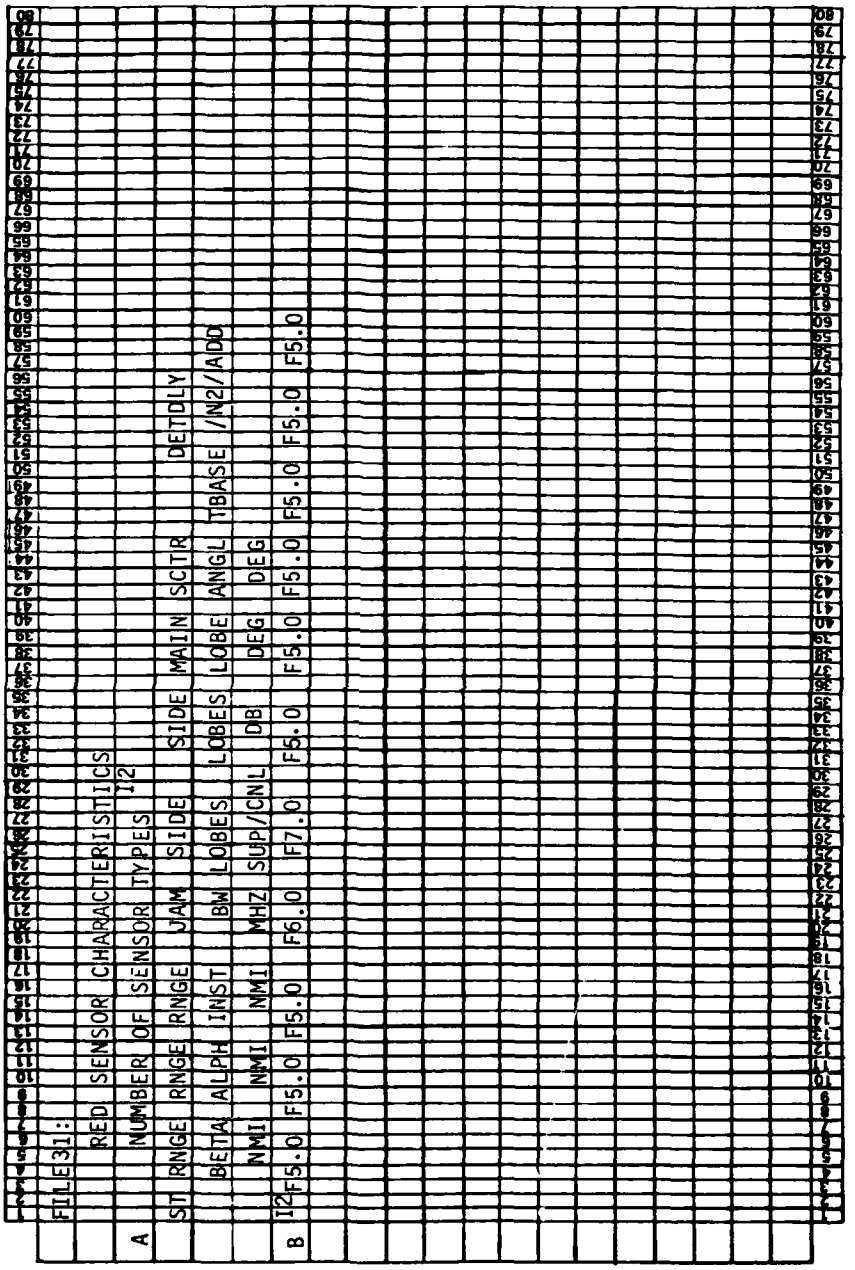

FILE31:
RED SENSOR CHARACTERISTICS
A
NUMBER OF SENSOR TYPES I2
ST RNGE RNGE RNGE J/AM SIDE SIDE MAIN SCTR DETDLY
BETA ALPH INST BW LOBES LOBES LOBE ANGL TBASE /N2/ADD
NMI NMI NMI MHZ SUP/CNL DB DEG DEG
I2 F5.0 F5.0 F5.0 F5.0 F6.0 F7.0 F5.0 F5.0 F5.0 F5.0 F5.0 F5.0
B

Figure 2.24-1

2.25 File 32 - Blue Aircraft Nuclear Vulnerability

The vulnerability of the Blue aircraft types identified in File 07, File 09, and File 12 to overpressure, dynamic pressure, impulse, shock particle velocity, gamma peak dose rate, neutron fluence, and thermal fluence are specified for two damage levels. The file layout is included as Figure 2.25-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, two for each aircraft type. The following is a description of the data elements.

TABLE 32

FILE 32 - BLUE AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	31-33		I3	Number of aircraft types: (between zero and ten).
FOR EACH AIRCRAFT TYPE:				
B	1-3	FTY	I3	Functional type number (2, 3, or 4) corresponding to a particular model or configuration of VAW, VAQ, or VF aircraft, see Files 07, 09, or 12 (dimensionless, integer).
	4-7	PTA	I4	Platform type number, corresponds to a particular model or configuration of VAW, VAQ, or VF aircraft in File 07, 09, or 12 (dimensionless, integer). Examples: 1 - E-2C; 2 - EA-6B; 1 - F-4B; 2 - F-14.

TABLE 32 (continued)

FILE 32 - BLUE AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	8-9	K	I2	Damage level, use 1 on line image B for loss of mission capability (dimensionless, integer).
	10-16	OP PSI	F7.0	Overpressure threshold at which the aircraft incurs loss of mission capability (psi, real).
	17-23	DP PSI	F7.0	Dynamic pressure threshold at which the aircraft incurs loss of mission capability (psi, real).
	24-31	IMPULSE PSI-SEC	F8.0	Impulse threshold at which aircraft incurs loss of mission capability (psi-seconds, real).
	32-39	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path at which aircraft incurs loss of mission capability (feet per second, real).
	40-47	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component along flight path at which aircraft incurs loss of mission capability (feet per second, real).
	48-55	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which aircraft incurs loss of mission capability (Rad(Si) per second, real).

TABLE 32 (continued)

FILE 32 - BLUE AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	56-63	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which aircraft incurs loss of mission capability (neutrons per square centimeter, real).
	64-71	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which aircraft incurs loss of mission capability (calories per square centimeter, real).
C	8-9	K	I2	Damage level, use 2 on line image C for loss of aircraft (dimensionless, integer).
	10-16	OP PSI	F7.0	Overpressure threshold at which aircraft is lost (psi, real).
	17-23	DP PSI	F7.0	Dynamic pressure threshold at which aircraft is lost (psi-seconds, real).
	24-31	IMPULSE PSI/SEC	F8.0	Impulse threshold at which aircraft is lost (psi-seconds, real).
	32-39	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across aircraft flight path at which aircraft is lost (feet per second, real).
	40-47	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component along aircraft flight path at which aircraft is lost (feet per second, real).
	48-55	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which aircraft is lost (Rad (Si) per second, real).

TABLE 32 (continued)

FILE 32 - BLUE AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	56-63	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which aircraft is lost (neutrons per square centimeter, real).
	64-71	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which aircraft is lost (calories per square centimeter, real).

NOTE: To make a nuclear weapon effect nonapplicable to a platform type, enter a zero on line image B (K = 1). To make it ineffective for a particular damage level, enter a very large value (e.g.,1.E60).

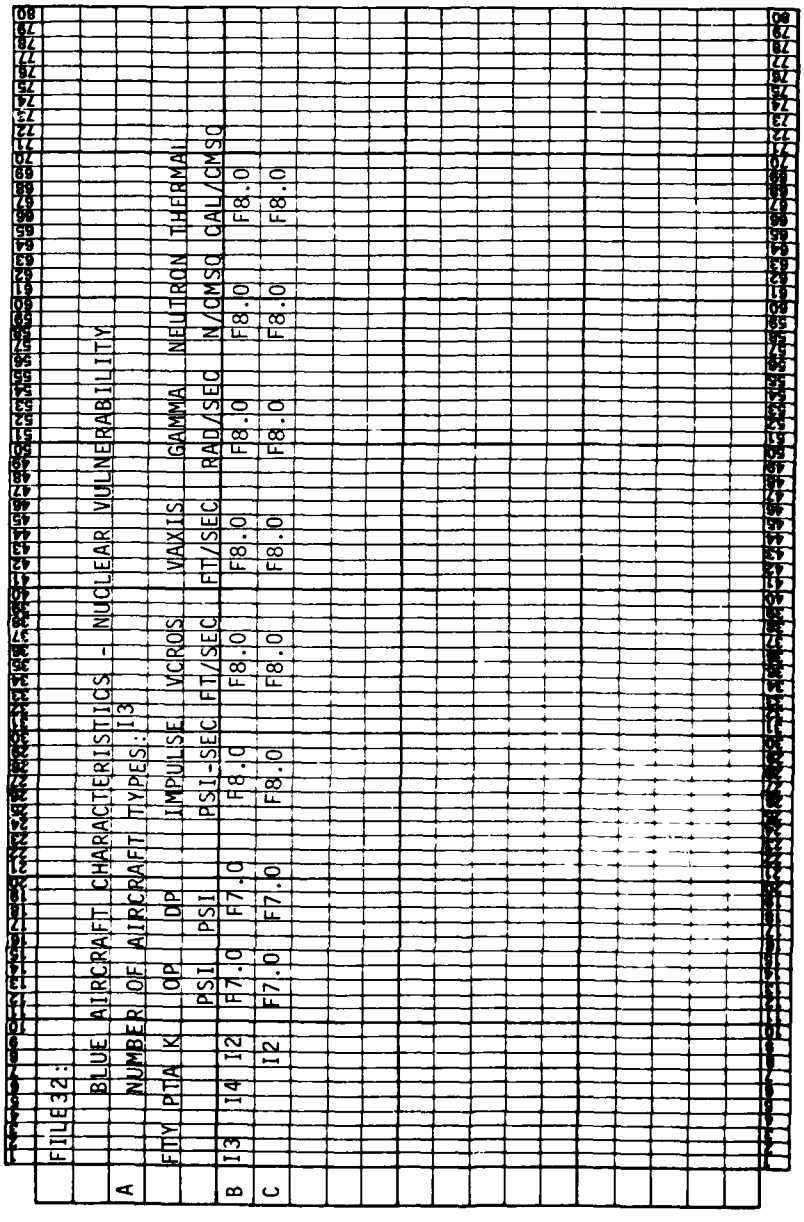

FILE32: BLUE AIRCRAFT CHARACTERISTICS - NUCLEAR VULNERABILITY
A NUMBER OF AIRCRAFT TYPES: I3
FTY PTA K OP DP IMPULSE VCROS VAXIS GAMMA NEUTRON THERMAL
PSI PSI PSI-SEC FT/SEC FT/SEC RAD/SEC N/CMSQ CAL/CMSQ
B I3 I4 I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0
C I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0

Figure 2.25-1

2.26 File 34 - Blue Ship Nuclear Vulnerability

The vulnerability of the Blue ship types identified in File 14 to overpressure, dynamic pressure, impulse, gamma peak dose rate, neutron fluence, and thermal fluence are specified for six damage levels. The file layout is included as Figure 2.26-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, six for each ship type. The following is a description of the data elements.

TABLE 34

FILE 34 - BLUE SHIP NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	32-34		I3	Number of Blue ship types (between zero and ten).
FOR EACH BLUE SHIP TYPE:				
B	1-3	PTS	I3	Platform type number (from 1 to 10) corresponding to a particular ship class or configuration, see also File 14 (dimensionless, integer). Examples: 1 - CVN-68; 2 - CGN-38; 3 - CGN-35; 4 - CG-26; 5 - CG-16; 6 - DDG-47; 7 - DDG-10; 8 - DDG-2.
	4-5	K	I2	Damage level, use 1 on line image B for radar down (dimensionless, integer).
	6-12	OP PSI	F7.0	Overpressure threshold at which ship radar goes down (psi, real).

TABLE 34 (continued)

FILE 34 - BLUE SHIP NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	13-19	DP PSI	F7.0	Dynamic pressure threshold at which ship radar goes down (psi, real).
	20-27	IMPULSE PSI-SEC	F8.0	Impulse threshold at which ship radar goes down (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Not normally relevant to ships, but included for consistency. Enter zero on line image B to preclude consideration of this effect (ft/sec, real).
	36-43	VAXIS FT/SEC	F8.0	Not normally relevant to ships, but included for consistency. Enter zero on line image B to preclude consideration of this effect (ft/sec, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which ship radar goes down (Rad(Si) per second, real).
	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which ship radar goes down (neutrons per square centimeter, real).
	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which ship radar goes down (calories per square centimeter, real).

TABLE 34 (*continued*)

FILE 34 - BLUE SHIP NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C	4-5	K	I2	Damage level (dimensionless, integer). All levels include the damage defined for lower levels. Enter consecutively on successive line image C's as shown in Figure 2.26-1: 2 - 50% weapon delivery impairment; 3 - 100% weapon delivery impairment; 4 - 90% mobility impairment; 5 - 90% seaworthiness impairment; 6 - Ship destroyed (sunk).
	6-12	OP PSI	F7.0	Overpressure threshold at which ship incurs the damage level (psi, real).
	13-19	DP PSI	F7.0	Dynamic pressure threshold at which ship incurs the damage level (psi, real).
	20-27	IMPULSE PSI/SEC	F8.0	Impulse threshold at which ship incurs the damage level (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Not normally relevant to ships, but included for consistency. Zero on line image B will preclude consideration of this effect (ft/sec, real).
	36-43	VAXIS FT/SEC	F8.0	Not normally relevent to ships, but included for consistency. Zero on line image B will preclude consideration of this effect (ft/sec, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which ship incurs the damage level (Rad(Si) per second, real).

TABLE 34 (continued)

FILE 34 - BLUE SHIP NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which ship incurs the damage level (calories per square centimeter, real).
	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which ship incurs the damage level (calories per square centimeter, real).

NOTE: To make a nuclear weapon effect nonapplicable to a platform type, enter a zero on line image B (K = 1). To make it ineffective for a particular damage level, enter a very large value (e.g., 1.E60).

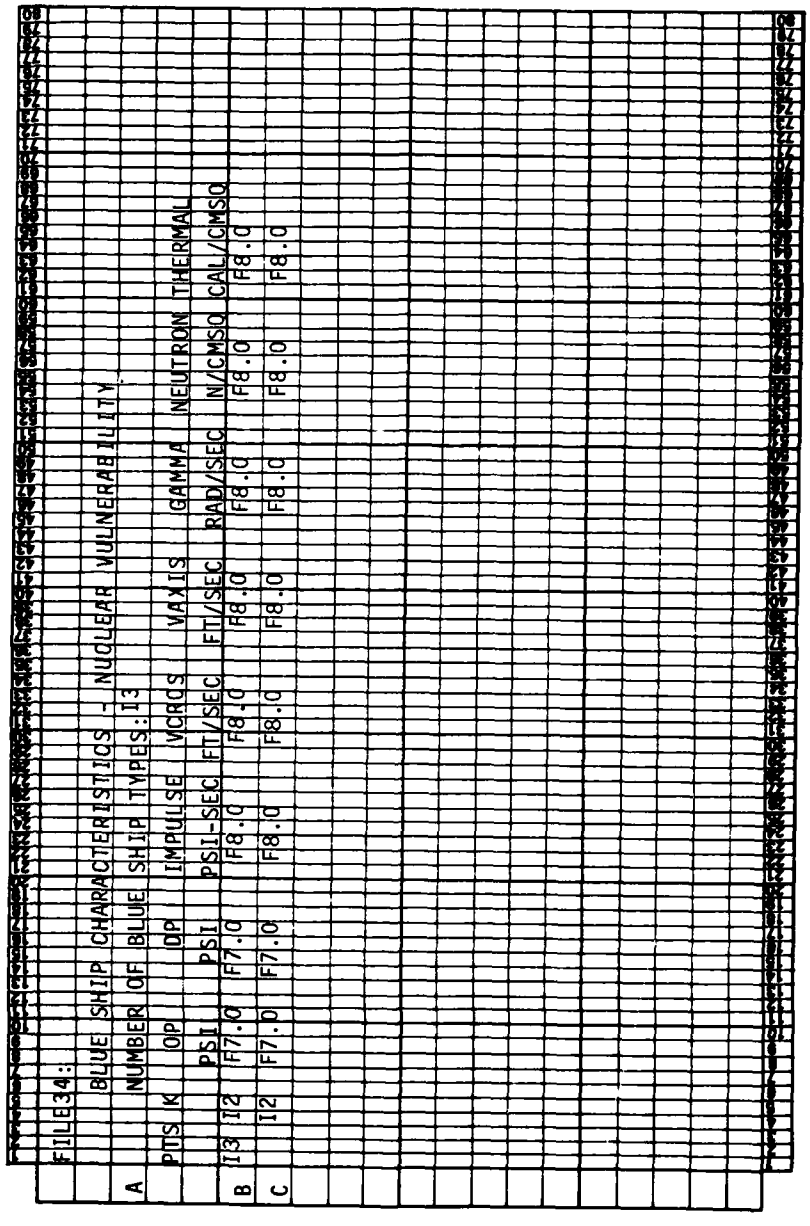

FILE34:
BLUE SHIP CHARACTERISTICS - NUCLEAR VULNERABILITY
A NUMBER OF BLUE SHIP TYPES:I3
PTS K OP PSI OP IMPULSE VCRDS VAXIS GAMMA NEUTRON THERMAL
PSI PSI-SEC FT/SEC FT/SEC FT/SEC RAD/SEC N/CMSQ CAL/CMSQ
B I3 I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0
C I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0

Figure 2.26-1

2.27 File 36 - Red Aircraft Nuclear Vulnerability

The vulnerability characteristics of the Red aircraft types identified in File 16 to overpressure, dynamic pressure, impulse, shock particle velocity, gamma peak dose rate, neutron fluence, and thermal fluence are specified for two damage levels. The file layout is included as Figure 2.27-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, two for each aircraft type. The following is a description of the data elements.

TABLE 36

FILE 36 - RED AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	35-37		I3	Number of Red aircraft types (between zero and twenty).
FOR EACH RED AIRCRAFT TYPE:				
B	1-3	PTA	I3	Platform type number (from 1 to 20) corresponding to a particular model or configuration of Red aircraft, see also File 16 (dimensionless, integer). Examples: 1 - Backfire; 2 - Blinder; 3 - Bear; 4 - Foxbat.
	4-5	K	I2	Damage level, use 1 for loss of mission capability on line image B (psi, real).
	6-12	OP PSI	F7.0	Overpressure threshold at which aircraft incurs loss of mission capability (psi, real).

TABLE 36 (continued)

FILE 36 - RED AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	13-19	DP PSI	F7.0	Dynamic pressure threshold at which the aircraft incurs loss of mission capability (psi, real).
	20-27	IMPULSE PSI/SEC	F8.0	Impulse threshold at which the aircraft incurs loss of mission capability (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path of aircraft at which aircraft incurs loss of mission capability (feet per second, real).
	36-43	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component along flight path of aircraft at which aircraft incurs loss of mission capability (feet per second, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which aircraft incurs loss of mission capability (Rad(Si) per second, real).
	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which aircraft incurs loss of mission capability (neutrons per square centimeter, real).
	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which aircraft incurs loss of mission capability (calories per square centimeter, real).
C	4-5	K	I2	Damage level, use 2 on line image C for loss of aircraft (dimensionless, integer).
	6-12	OP PSI	F7.0	Overpressure threshold at which aircraft is lost (psi, real).

TABLE 36 (continued)

FILE 36 - RED AIRCRAFT NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	13-19	DP PSI	F7.0	Dynamic pressure threshold at which aircraft is lost (psi, real).
	20-27	IMPULSE PSI/SEC	F8.0	Impulse threshold at which aircraft is lost (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path of aircraft at which aircraft is lost (feet per second, real).
	36-43	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component along flight path of aircraft at which aircraft is lost(feet per second, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which aircraft is lost (Rad(Si) per second, real).
	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which aircraft is lost (neutrons per square centimeter, real).
	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which aircraft is lost (calories per square centimeter, real).

NOTE: To make a nuclear weapon effect nonapplicable to a platform type, enter a zero on line image B (K = 1). To make it ineffective for a particular damage level, enter a very large value (e.g., 1.E60).

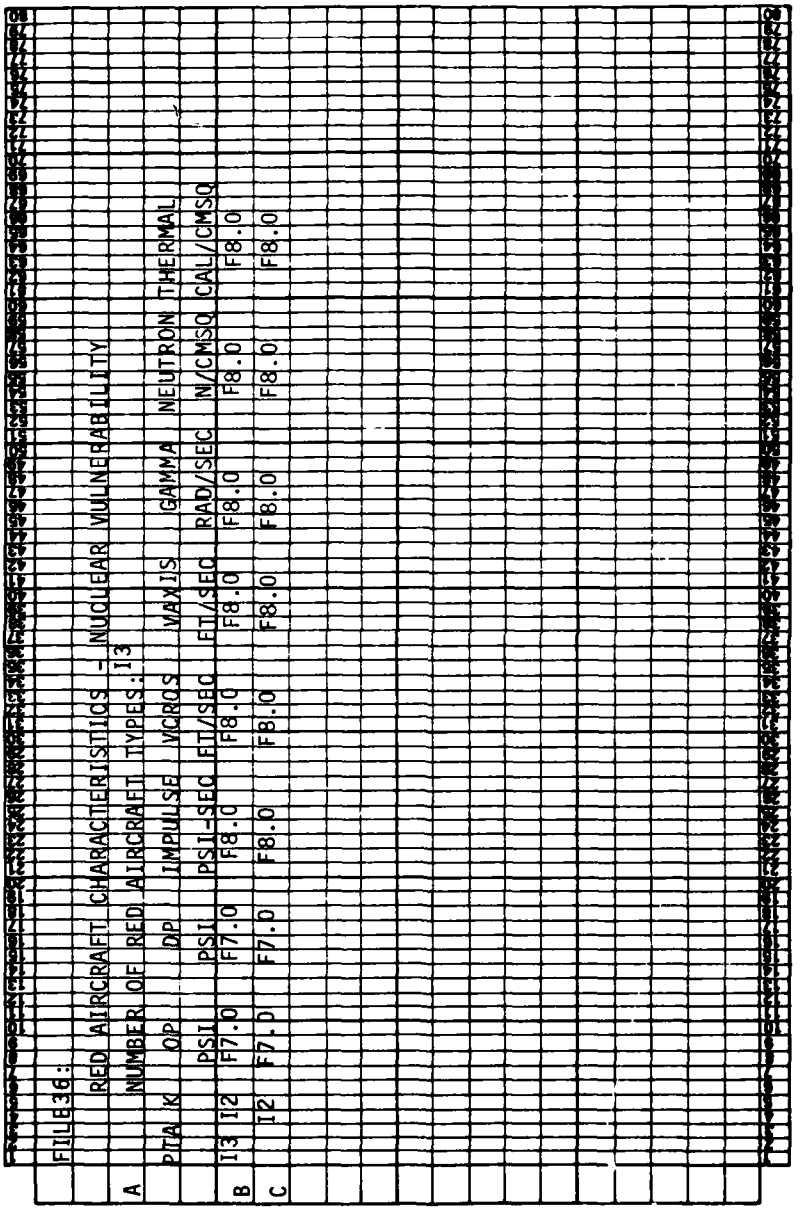

FILE36: RED AIRCRAFT CHARACTERISTICS - NUCLEAR VULNERABILITY
A NUMBER OF RED AIRCRAFT TYPES:I3
PTA K OP DP IMPULSE VGROS VAXIS GAMMA NEUTRON THERMAL
PSI PSI PSI-SEC FT/SEC FT/SEC RAD/SEC N/CMSQ CAL/CMSQ
B I3 I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0
C I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0

Figure 2.27-1

2.28 File 37 - Red Missile Nuclear Vulnerability

The vulnerability characteristics of the Red missile types identified in File 17 to overpressure, dynamic pressure, impulse, shock particle velocity, gamma peak dose rate, neutron fluence, and thermal fluence are specified for three damage levels. The file layout is included as Figure 2.28-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines, three for each missile type. The following is a description of the data elements.

TABLE 37

FILE 37 - RED MISSILE NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	34-36		I3	Number of Red missile types (between zero and ten).
FOR EACH RED MISSILE TYPE:				
B	1-3	MT	I3	Number (from 1 to 10) corresponding to a particular type of Red antiship missile (dimensionless, integer). Examples: 1 - Kitchen; 2 - Kelt; 3 - SS-N-7; 4 - SS-N-10. (See also File 17).
	4-5	K	I2	Damage level. Use 1 on line image B (1 = Missile airframe and/or guidance damaged. Missile killed if non-nuclear) (dimensionless, integer).
	6-12	OP PSI	F7.0	Overpressure threshold at which missile incurs level 1 damage (psi, real).

TABLE 37 (continued)

FILE 37 - RED MISSILE NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
B (cont)	13-19	DP PSI	F7.0	Dynamic pressure threshold at which missile incurs level 1 damage (psi, real).
	20-27	IMPULSE PSI/SEC	F8.0	Impulse threshold at which missile incurs level 1 damage (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path of missile at which missile incurs level 1 damage (feet per second, real).
	36-43	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component along flight path of missile at which missile incurs level 1 damage (feet per second, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which missile incurs level 1 damage (Rad(si) per second, real).
	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which missile incurs level 1 damage (neutrons per square centimeter, real).
	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which missile incurs level 1 damage (calories per square centimeter, real).
C	4-5	K	I2	Damage level. Enter consecutively on successive line image C's as shown in Figure 2.28-1: 2 - Salvage fuse is fired; 3 - Warhead disables (dimensionless, integer).

TABLE 37 (continued)

FILE 37 - RED MISSILE NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	6-12	OP PSI	F7.0	Overpressure threshold at which missile incurs indicated damage level (psi, real).
	13-19	DP PSI	F7.0	Dynamic pressure threshold at which missile incurs indicated damage level (psi, real).
	20-27	IMPULSE PSI/SEC	F8.0	Impulse threshold at which missile incurs indicated damage level (psi-seconds, real).
	28-35	VCROS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path of missile at which missile incurs indicated damage level (feet per second, real).
	36-43	VAXIS FT/SEC	F8.0	Threshold value for shock particle velocity component across flight path of missile at which missile incurs indicated damage level (feet per second, real).
	44-51	GAMMA RAD/SEC	F8.0	Threshold value for gamma peak dose rate at which missile incurs indicated damage level (Rad(Si) per second, real).
	52-59	NEUTRON N/CMSQ	F8.0	Threshold value for neutron fluence at which missile incurs indicated damage level (neutrons per square centimeter, real).

TABLE 37 (continued)

FILE 37 - RED MISSILE NUCLEAR VULNERABILITY:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	60-67	THERMAL CAL/CMSQ	F8.0	Threshold value for thermal fluence at which missile incurs indicated damage level (calories per square centimeter, real).

NOTE: To make a nuclear weapon effect nonapplicable to a platform type, enter a zero on line image B (K = 1). To make it ineffective for a particular damage level, enter a very large value (e.g., 1.E60). If a missile has no salvage fusing, enter 1.E60 for all columns opposite K = 2.

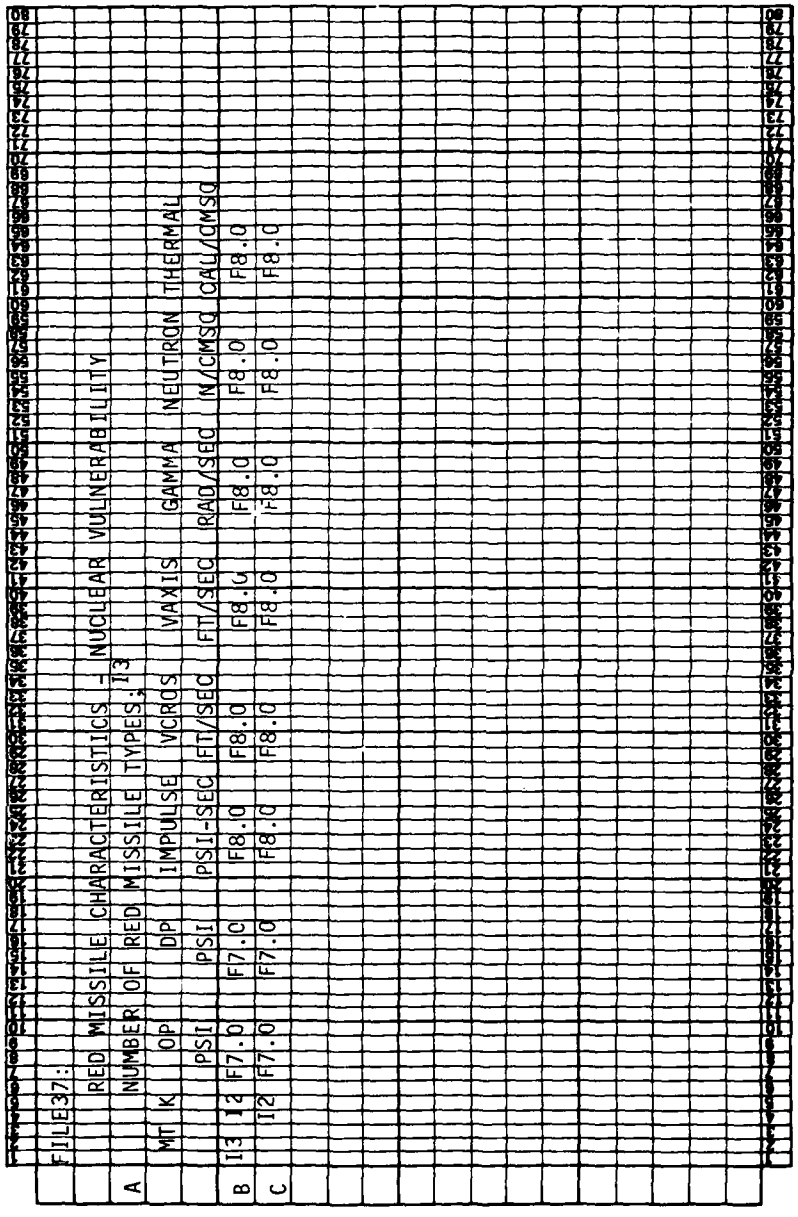

FILE37:
RED MISSILE CHARACTERISTICS - NUCLEAR VULNERABILITY
A
NUMBER OF RED MISSILE TYPES: I3
MT K OP DP IMPULSE VCROS VAXIS GAMMA NEUTRON THERMAL
PSI PSI PSI-SEC FIT/SEC FIT/SEC RAD/SEC N/CMSQ CAL/CMSQ
B I3 I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0
C I2 F7.0 F7.0 F8.0 F8.0 F8.0 F8.0 F8.0 F8.0

Figure 2.28-1

2.29 File 39 - Intelligence Data on Red Aircraft

Tactical intelligence data to be used by BLUE command and control algorithms: attack speeds and launch ranges for Red aircraft; desired keepout ranges; number of aircraft by type assumed in a cell; missions for this type aircraft; and, assumed coverage factors for BLUE fighters are specified by the airframe label. The file layout is shown in Figure 2.29-1. Two title lines precede line image A and two column heading lines precede line image B. The file contains a variable number of data lines representing the different nominal types of Red aircraft. The following is a description of the data elements.

TABLE 39

FILE 39 - INTELLIGENCE DATA ON RED AIRCRAFT:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	35-37		I3	Number of Red aircraft types (between zero and twenty).
B	49-52		F4.0	Estimated maximum launch range for Red bombers; intelligence estimate of Red bombers' missile launch range (nautical miles, real).
FOR EACH RED AIRCRAFT TYPE:				
C	1-2	AL	I2	Airframe label (from 1 to 20) corresponding to the nominal type of Red aircraft, i.e., Backfire, Bear (dimensionless, integer). NOTE: Does not correspond to platform type number in File 16, Red Aircraft Characteristics.
	3-6	ATK KN	F4.0	Attack speed associated with the particular type of Red aircraft (knots, real).
	7-10	RKO NMI	F4.0	Keepout range for the particular type of Red aircraft (nautical miles from Force Center, real).

TABLE 39 (continued)

FILE 39 - INTELLIGENCE DATA ON RED AIRCRAFT:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	11-13	NE	I3	Number of aircraft expected to be in a cell given no raid count for the cell, for this particular type of Red aircraft (aircraft, integer).
	14-16	T1	I3	First applicable functional type for the particular type of Red airframe (dimensionless, integer): 1 - Bomber; 2 - Fighter escort; 3 - Reconnaissance; 4 - Standoff jammer.
	17-19	T2	I3	Second applicable functional type for the particular type of Red airframe (dimensionless, integer).
	20-22	T3	I3	Third applicable functional type for the particular type of Red airframe (dimensionless, integer).
	23-25	T4	I3	Fourth applicable functional type for the particular type of Red airframe (dimensionless, integer).
NOTE: FOR UP TO TEN TYPES OF BLUE AIRCRAFT (NUMBER OF AIRCRAFT TYPES SHOULD CORRESPOND TO NUMBER IN FILE 12, BLUE AIRCRAFT CHARACTERISTICS)				
	26-29	B1	F4.0	Number of Red aircraft of the particular type that the first type of Blue aircraft can cover in an intercept mission (Red aircraft, real).

TABLE 39 (continued)

FILE 39 - INTELLIGENCE DATA ON RED AIRCRAFT:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	30-33	B2	F4.0	Number of Red aircraft of the particular type that the second type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	34-37	B3	F4.0	Number of Red aircraft of the particular type that the third type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	38-41	B4	F4.0	Number of Red aircraft of the particular type that the fourth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	42-45	B5	F4.0	Number of Red aircraft of the particular type that the fifth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	46-49	B6	F4.0	Number of Red aircraft of the particular type that the sixth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	50-53	B7	F4.0	Number of Red aircraft of the particular type that the seventh type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	54-57	B8	F4.0	Number of Red aircraft of the particular type that the eigth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).

TABLE 39 (continued)

FILE 39 - INTELLIGENCE DATA ON RED AIRCRAFT:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
C (cont)	58-61	B9	F4.0	Number of Red aircraft of the particular type that the ninth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).
	62-65	B10	F4.0	Number of Red aircraft of the particular type that the tenth type of Blue aircraft can cover in an intercept mission (Red aircraft, real).

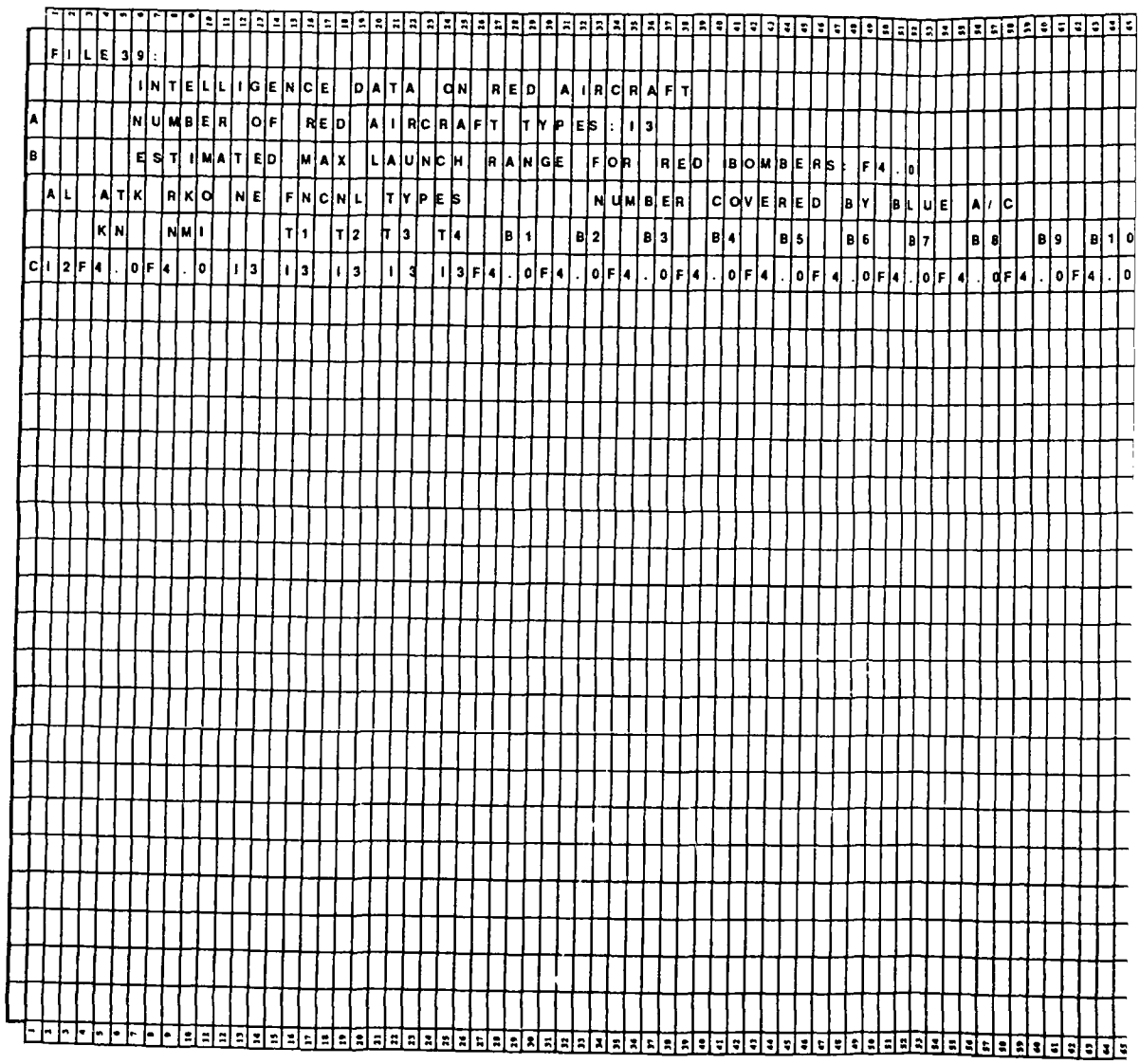

FILE39:
INTELLIGENCE DATA ON RED AIRCRAFT
A NUMBER OF RED AIRCRAFT TYPES: I3
B ESTIMATED MAX LAUNCH RANGE FOR RED BOMBERS: F4.0
AL ATK RKO NE FNCNL TYPES NUMBER COVERED BY BLUE A/C
KN NMI T1 T2 T3 T4 B1 B2 B3 B4 B5 B6 B7 B8 B9 B10
C I2F4.0F4.0 I3 I3 I3 I3 I3F4.0F4.0F4.0F4.0F4.0F4.0F4.0F4.0F4.0F4.0

Figure 2.29-1

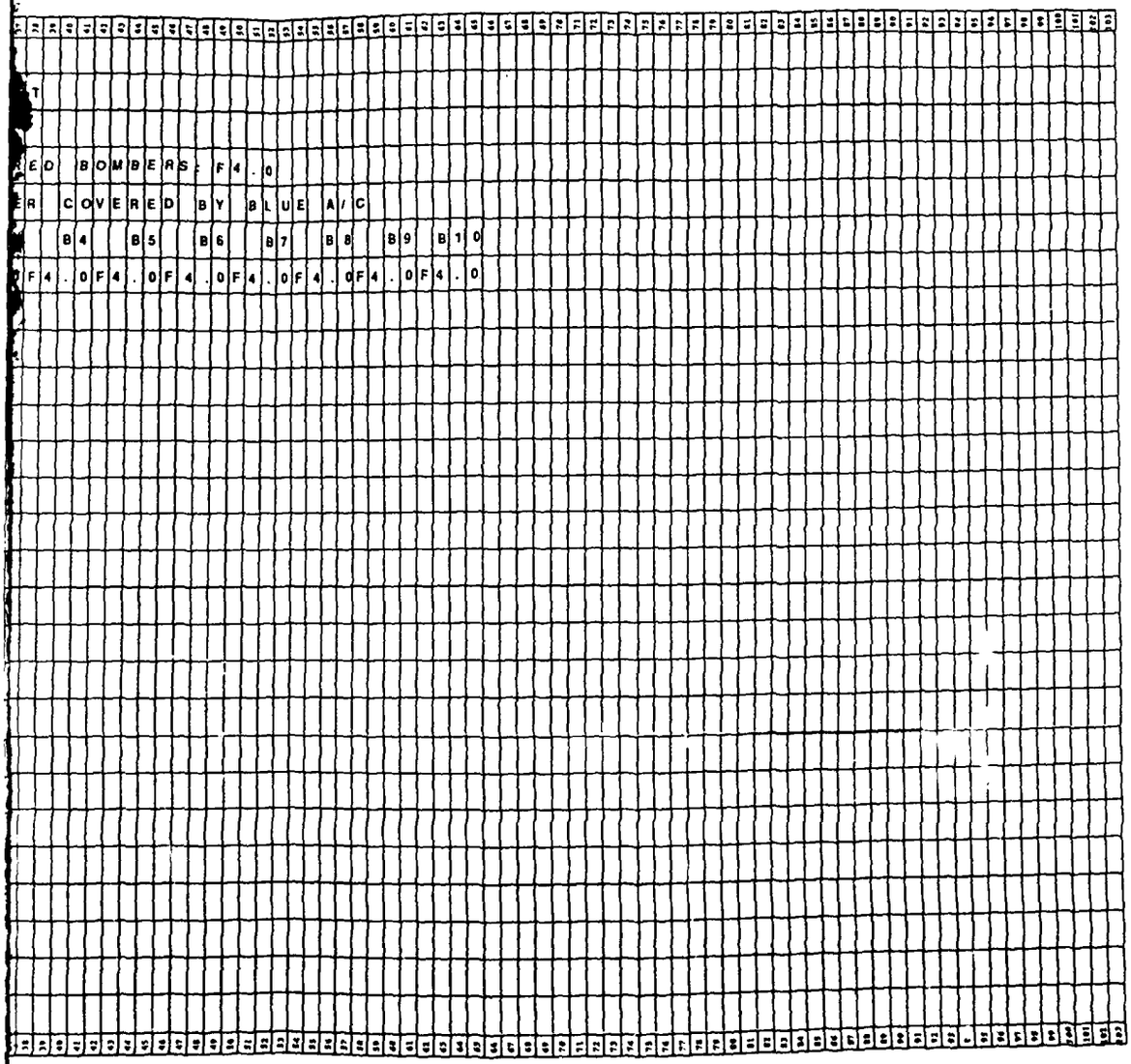

T
ED BOMBERS: F4.0
ER COVERED BY BLUE A/C
B4 B5 B6 B7 B8 B9 B10
F4.0F4.0F4.0F4.0F4.0F4.0F4.0

Figure 2.29-1

2.30 File 40 - External Surveillance Message

The external surveillance message data to be furnished to the Battle Force during the simulation. The file layout is included as Figure 2.30-1. Two title lines and two column heading lines precede line image A. The file contains a variable number of data lines representing the surveillance messages information. The following is a description of the data elements.

TABLE 40

FILE 40 - EXTERNAL SURVEILLANCE MESSAGES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A	1-7	TRCV MIN	F7.0	Time that the Command Center is to receive the message (minutes, real). Must not be less than 0.05.
	8-14	TOBS MIN	F7.0	Time of the external surveillance observation (minutes, real).
	15-19	GID	I5	Group identifier of the observed cell: a cell is a group of Red aircraft assumed to be of the same or known airframe (see also File 39, Intelligence Data on Red Aircraft) (dimensionless, integer).
	20-29	XCOORD NMI	F10.0	X-coordinate of the position at which the group of Red aircraft was observed (nautical miles, real).
	30-39	YCOORD NMI	F10.0	Y-coordinate of the position at which the group of Red aircraft was observed (nautical miles, real).

TABLE 40 (continued)

FILE 40 - EXTERNAL SURVEILLANCE MESSAGES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A (cont)	40-45	ALTD KF	F6.0	Altitude at which the group of Red aircraft was observed (kilofeet, real).
	46-53	SIG-MAX NMI	F8.0	Standard deviation of the positional uncertainty in the observed Red group's position along the semi-major axis of the positional uncertainty ellipse (nautical miles, real). See Figure 2.30-2.
	54-61	SIG-MIN NMI	F8.0	Standard deviation of the positional uncertainty in the observed Red group's position along the semi-minor axis of the position uncertainty ellipse (nautical miles, real). See Figure 2.30-2.
	62-67	RHO DEG	F6.0	Orientation of the semi-major axis of the positional uncertainty ellipse relative to grid north (degrees, real). See Figure 2.30-2.
	68-70	RC	I3	Number of aircraft identified in the Red group: use zero if count unknown (Red aircraft, integer).

TABLE 40 (continued)

FILE 40 - EXTERNAL SURVEILLANCE MESSAGES:
DATA INPUT FORMAT DESCRIPTION

LINE IMAGE	COLUMNS	COLUMN HEADING	READ FORMAT	DATA ELEMENT DEFINITION(S) AND COMMENTS
A (cont)	71-73	AL	I3	Airframe label corresponding to the particular type of Red aircraft, should correspond to an AL value in File 39, Intelligence Data on Red Aircraft: use zero if airframe label unknown (not identified by the external surveillance message) (dimensionless, integer).
	74-76	ML	I3	Mission label or function type of the aircraft in the observed Red group (dimensionless, integer): 0 = Unknown; 1 = Bomber; 2 = Fighter escort; 3 = Reconnaissance; 4 = Standoff jammer.

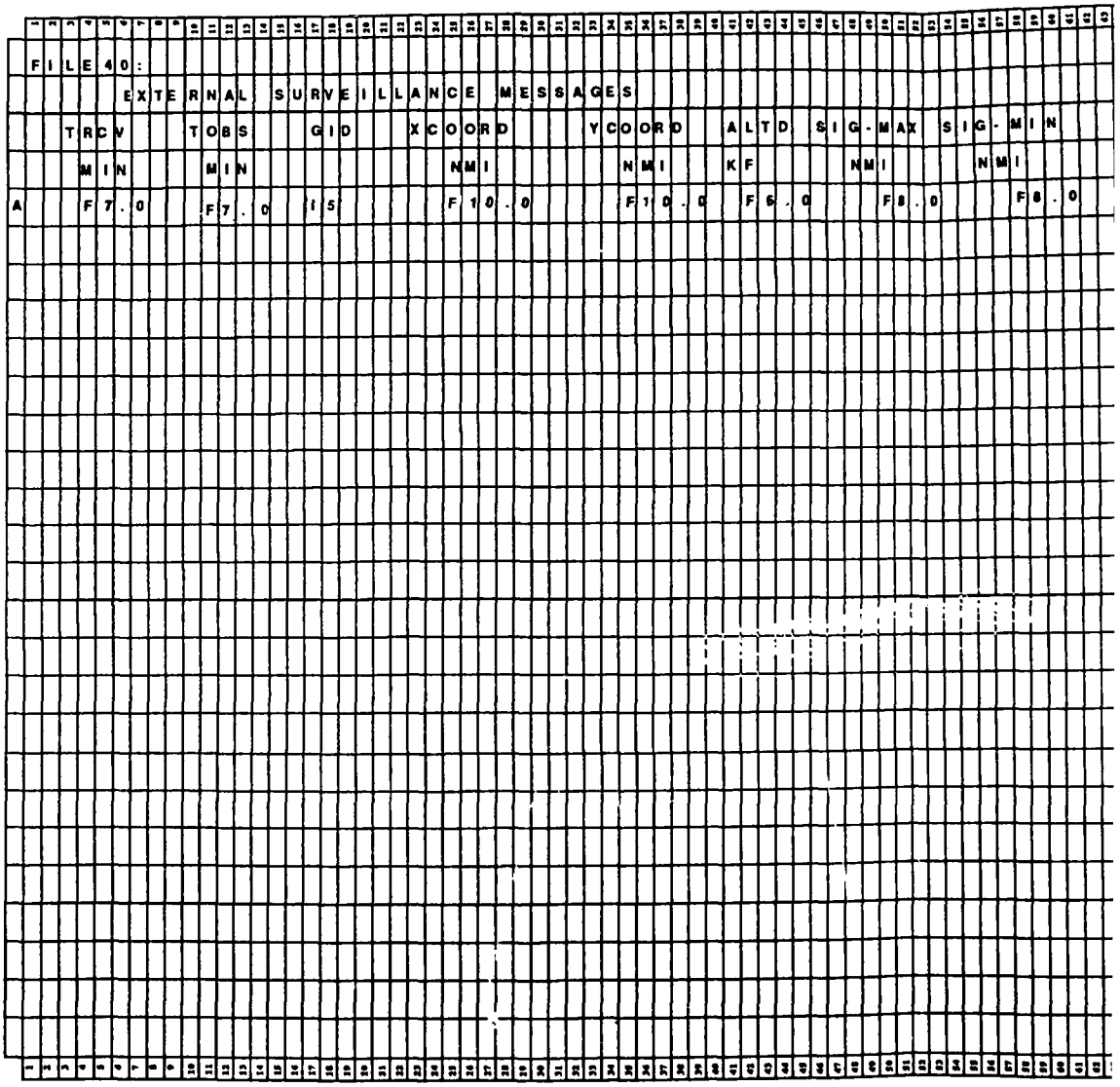

FILE 40:
EXTERNAL SURVEILLANCE MESSAGES
TRCV
MIN
TOBS
MIN
GID
XCOORD
NMI
YCOORD
NMI
ALTD
KF
SIG-MAX
NMI
SIG-MIN
NMI
A
F7.0
F7.0
I5
F10.0
F10.0
F6.0
F8.0
F8.0

Figure 2.30-1

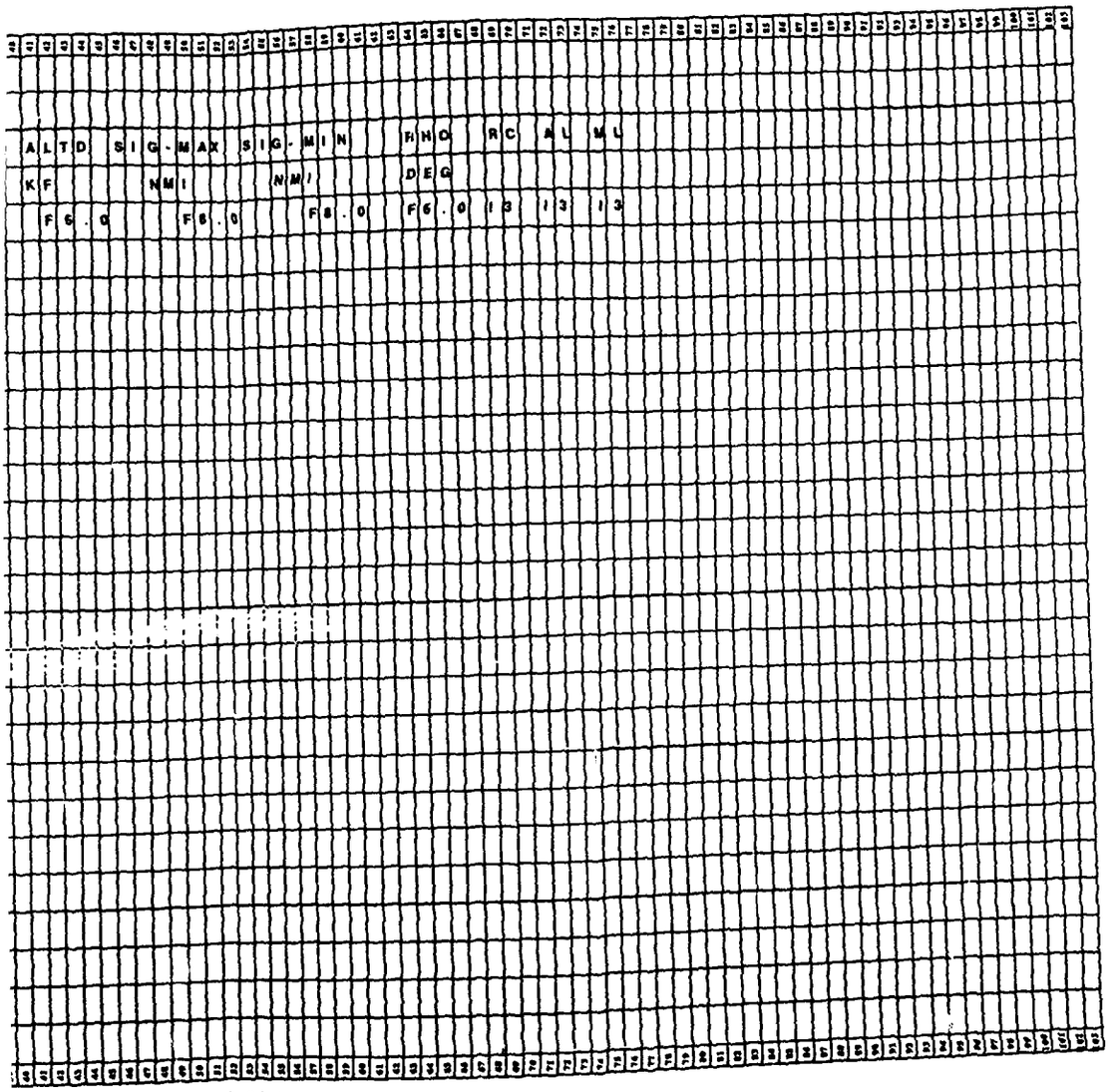

ALTD SIG-MAX SIG-MIN PHO RC AL ML
KF NMI NMI DEG
F6.0 F6.0 F8.0 F6.0 I3 I3 I3

Figure 2.30-1

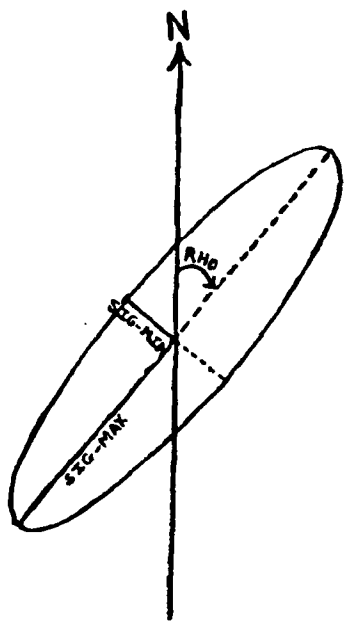


Figure 2.30-2 Uncertainty Ellipse For The Observed Group's Position

3 STANDARD REPORT PRINTOUTS

It is anticipated that NADS reporting requirements will vary from user to user, depending on the nature of particular studies that are being performed. However, there are a number of game statistics that will be of interest to most users. Six standard reports have been developed to provide this information and are described in the following paragraphs. Additional programming will be developed to produce any additional specialized reports that may be required.

3.1 Red Aircraft Report

Red aircraft actions and damage are summarized in the report illustrated in Figure 3.1-1. Statistics are shown for each aircraft and summed. An aircraft is "Engaged by VF" if a VF begins an intercept of the target. An aircraft is "Engaged by Ship" if a ship launches one or more SAMs at the target. Table entries marked "N" contain counts. Entries marked "X" contain "X" or blank and entries marked "I" contain Blue ID Number.

RED AIRCRAFT REPORT

AIRCRAFT NUMBER	NO. ASMS LAUNCHED	ENGAGED BY VF	KILLER FIGHTER	SAM ENGAGEMENTS	KILLER SHIPS
1	N	X	I	X	I
2	N	X	I	X	I
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
	NN	NN	NN	NN	NN

Figure 3.1-1. Red Aircraft Report Format

3.2 Red Missile Report

Statistics related to Red missiles are summarized in the report illustrated in Figure 3.2-1. The data are itemized by missile as well as summed for SSM (surface-to-surface missiles) and ASM (air-to-surface missiles). Identification numbers for SSM are assigned sequentially following the Red aircraft. ASM are assigned sequential numbers following SSM (if any) at the time of launch.

RED MISSILE REPORT

	Missile Number	Killer Fighter	SAM Engagements	Killer Ship	Penetrated to Point Defense	Conventional Hit on Ship	Nuclear Hit Near Ship
	N N	K K	M M	S S	P P	H H	X X
	• • •	• • •	• • •	• • •	• • •	• • •	• • •
SSM	NN	KK	MM	SS	PP	HH	XX
ASM	NN	KK	MM	SS	PP	HH	XX

Figure 3.2-1 Red Missile Report Format

N Missile Number (Red Unit ID)

NN Total Number of Missiles

K Killer Fighter Number

KK Total Number of Missiles Killed by Fighter (Blue Unit ID)

M Number of SAM's Engaging Particular Missile Number

MM Total Number of Missiles Engaged by SAMs

S Killer Ship Number (Blue Unit ID)

SS Total Number of Missiles Killed Ships

P Blue ID of point Defense that was Penetrated

PP Total Number of Missiles Penetrating Point Defense

H Blue ID of Ship Hit

HH Total Number of Conventional Hits on Ship

X Shows the Type of Failure of Near Hits of Missile

XX Total Number of Nuclear Hits Near Ship

AD-A174 709 USERS' MANUAL FOR NAVAL AIR DEFENSE SIMULATION (NADS) REVISION(U) TRW DEFENSE SYSTEMS GROUP MCLEAN VA SEARCH WATERWHEEL PROGRAM OFFICE 06 JUN 86 N00014-83-C-0547 3/3

UNCLASSIFIED F/G 15/7 NL

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

A missile "Penetrated to Point Defense" if it penetrated to the point defense range of the targeted ship. It could reach this point and still be killed by a SAM from another ship. If a missile penetrates to point of defense and is not marked as killed by SAMs, conventional hit on ship, or nuclear hit near ship, then it was killed by the point defense.

3.3 Blue Ship Report

Blue ship actions and damage are summarized in the report illustrated in Figure 3.3-1. Statistics are shown for each ship and summed. Six damage levels are possible, with the following meaning:

1 - Loss of air search radar

2 - 50% weapon delivery impairment

3 - 100% weapon delivery impairment

4 - 90% mobility impairment

5 - 90% seaworthiness impairment

6 - Ship destroyed (sunk)

BLUE SHIP REPORT

SHIP NUMBER	NO. CONVENT. SAMS FIRED	NO. NUCLEAR SAMS FIRED	CONVENTIONAL HITS ON SHIP	CUMULATIVE DAMAGE LEVEL
1	N	N	N	N
2	N	N	N	N
.	.	.	.	.
.	.	.	.	.
.	.	.	.	.
	NN	NN	NN	

FIGURE 3.3-1. Blue Ship Report Format

3.4 VF Report

Statistics describing VF activity appear in the report illustrated in Figure 3.4-1. CAP aircraft that are airborne at

the start of the game (if any) are numbered first. CAP and DLI launched during the game are assigned numbers as they are launched.

VF REPORT

VF NUMBER	NO. TARGETS ENGAGED	NO. AIMS FIRED TYPE1	TYPE2	TYPE3	TYPE4	KILLED IN DOGFIGHT	NO. FLIGHTS DURING GAME
1	N	N	N	N	N	X	X
2	N	N	N	N	N	X	X
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
	NN	NN	NN	NN	NN	NN	NN

FIGURE 3.4-1. VF Report Format

3.5 Log of Nuclear Bursts

The report listing all nuclear bursts occurring in the game is illustrated in Figure 3.5-1. Time is in seconds and XYZ coordinates are in kilometers. "Type" references the warhead type in File 18, Nuclear Warhead Characteristics. This can be used to determine whether it was a Red SSM, Red ASM or Blue SAM burst.

LOG OF NUCLEAR BURSTS

NUMBER	TIME	X	Y	Z	TYPE
1	NNN	NN.NNN	NN.NNN	NN.NNN	N
2	NNN	NN.NNN	NN.NNN	NN.NNN	N
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

Figure 3.5-1. Format for Log of Nuclear Bursts

3.6 Blue Damage Report

The Blue Damage Report illustrated in Figure 3.6-1 lists all Blue units in the game, itemizing Blue Unit ID; functional type (ship, VAW, VAQ, or VF); and cumulative damage level. The listing is ordered by functional type since Blue Unit IDs are assigned in that order. For VF, the corresponding VF IDs used in the VF report are shown. This dual numbering scheme is used for VF to permit smaller dimensions on FORTRAN common arrays containing data pertinent to VF only.

Up to six damage levels are shown for ships, which will duplicate the damage column in the Blue Ship Report. Only two levels of damage are recorded for Blue aircraft, with the following meaning:

1 - Loss of mission capability

2 - Loss of the aircraft

BLUE DAMAGE REPORT

BLUE ID	FUNCTIONAL TYPE	CUMULATIVE DAMAGE LEVEL
1	SHIP	N
2	SHIP	N
.	.	.
.	.	.
N	A/C 1 VAW 1	N
N	A/C 2 VAW 2	N
.	.	.
.	.	.
N	A/C 3 VAQ 1	N
N	A/C 4 VAQ 2	N
.	.	.
.	.	.
N	A/C 5 VF 1	N
N	A/C 6 VF 2	N
.	.	.
.	.	.

FIGURE 3.6-1. Blue Damage Report Format

4 PROCEDURE FOR EXECUTING NADS

NADS is currently implemented on the following: IBM 3033, VAX 11-750, and VAX 11-780 with G-floating option. On the IBM 3033, it runs as a batch job that is submitted from a terminal using CMS (Conversational Monitor System). While on the VAX 11-750/780 NADS can be run in the batch or interactive mode utilizing VMS (Virtual Memory System). Job preparation and submission can be described in terms of four steps:

1. Scenario development
2. Update of input data files
3. Update of GPSS constants
4. Simulation Execution

4.1 Scenario Development

This is possibly the most time-consuming step, depending on the user's familiarity with NADS and on the degree to which the game being developed differs from games for which data is already available.

Section 4.2 describes the input data files required for NADS. It is anticipated that most of these files will change infrequently. The others can build on existing data. It is suggested that data can be prepared most easily for a new run by marking changes on a computer listing of the input data for a previous run.

4.2 Update of Input Data Files

This step consists of the editing of existing input files to incorporate the changes required for the new scenario developed during Step 1. The files may be edited by logging onto a machine; linking to the disk containing the data input files; making the required changes using the text editor; and saving the updated data sets. Updated files should be reviewed carefully for errors since automatic data edits have not yet been developed.

In order to make the data input files readable by FORTRAN, they have all been assigned the file name "FILE" and the file type "FTnnF001", where nn is the file number referenced by FORTRAN. These file numbers are listed in Section 4.2.

4.3 Update of GPSS Constants

The initialization of most GPSS savevalues is performed automatically by the same FORTRAN program (INIT) that reads the data input files and initializes FORTRAN COMMON. However, there are a few instances where GPSS constants must be updated directly by the user; these are GPSS blocks that require specification of constant parameters prior to assembly. To change the psuedo-random number sequence in GPSS requires a change to the RMULT card.

The GPSS program can be updated in the same way as the input data files as described in Section 4.2. While logged onto CMS of the IBM 3033, the data set containing the program is modified and saved. The data set is named NADSnn, where nn is the current version number followed by the revision number of the program.

4.4 Simulation Execution

4.4.1 IBM 3033

An EXEC procedure named GPSSEX has been developed to facilitate submission of a NADS run to the batch processor. It is executed by the CMS command: "BC JOB GPSSEX." The EXEC requests five inputs from the user:

1. User ID to appear on the output
2. Security classification
3. Maximum execution time
4. Location where job is to be printed
5. Name of data set containing the GPSS program to be executed.

The EXEC submits the JCL, GPSS source program, link edited FORTRAN load module, and data input files to the batch system for execution. Once the job has been transmitted to the batch processor, the user can either log off CMS or begin preparation of another NADS run.

4.4.2 VAX 11-750/780/8600

Execution of NADS on the VAX 11-750/780 is done using two command procedures. The first procedure automatically invokes the second which in turn utilizes a third file.

The first procedure (for an interactive run), is invoked via the following command:

```
$@Procedure name.COM
```

For a batch run the first procedure is invoked via

```
$Submit/Noprint/CPUtime=4::.  Command Procedure name.COM
```

and follows the procedures below.

When using the batch run, one or more command procedures can be submitted for batch job execution. In doing so, you must specify a file name; if not specified, the SUBMIT command uses the default file type of (.COM). If more than one file is specified, you can separate them either with commas (,) or plus signs (+); in either case, the files are concatenated and processed as a single input stream, a single job.

If you wish that a job not be queued for printing, the NOPRINT qualifier can be used. By default, if you omit the qualifier, the job log is printed on SYS$PRINT.

A time limit can be set for CPU time for the batch job, (/CPUtime = n). This is used when less CPU time is needed, the qualifier can override the base queue value established by the system manager or the value authorized in your user authorization file. When needed, you can specify NONE or INFINITE for n. None for default to your user authorization file or limit specified on the queue, or infinite when requesting an infinite amount of time. However, you can not request more time than permitted by the base limit or your own user authorization file.

There are various qualifiers that can be used when submitting a batch run, which are described in the VAX/VMS Command Language User's Guide under SUBMIT.

An example of a typical first command procedure is:

```
$ DELETE AIM.OUT;*

$ DELETE AIM.MIS;*

$ DELETE AIM.RED;*

$ DELETE AIM.BLU;*

$ @QNP AIM.DAT AIM.OUT AIM.MIS AIM.RED AIM.BLU AIM.VAW
```

The first four lines of the procedure delete all previous versions of the four output files created by NADS. The last line invokes the command procedure QNP.COM (where the extension is assumed to be .COM and thus can be omitted). The command procedure QNP is called with five parameters which are file names. The first file name is the list of input data file names to be used for this NADS run. The second file name is the file to which all the printed output is written. The last three files are binary plot files containing RED missile data, RED bomber data and BLUE fighter data, respectively.

A typical QNP procedure is:

```
$ DELETE NADS.MAP;*

$ DELETE TEST.EXE;*

$ SET VERIFY

$ ASSIGN 'P1' FOR050

$ ASSIGN 'P3' FOR045

$ ASSIGN 'P4' FOR046

$ ASSIGN 'P5' FOR047

$ ASSIGN 'P6' FOR048

$ ASSIGN 'P2' FOR006

GPSSHELP:==$SYS$SYSTEM:GPSSHELP

GPSSHELP TEST
```

```
$ PRINT/DELETE 'P2'
```

The first two lines of this prodecure delete all old versions of the files NADS.MAP and TEST.EXE. The next instruction tells the system to verify to the user when various things occur. The ASSIGN statements assign the various file names as specified in the parameter list to the appropriate file numbers referenced in the simulation. For example, AIM.OUT is the same as unit 6 and AIM.DAT is the same as unit 50. The next line defines a foreign command and is required to operate GPSS/VX. The instruction GPSSHELP TEST specifies the command defined in the previous line and invokes a third file TEST.GPH. This instruction may invoke various qualifiers as described in the GPSS for VAX/VMS Reference Manual Appendix C and is the file utilized to link and run NADS.

An example of a TEST.GPH file is:

```
GPSS = NADS.GPS/TRACE = TERMINAL
HELP = [NADS]HLPRTN, [NADS]NADSBLOCK/HLPRTN
FILE = [NADS]NADS.OLB/LIBRARY
FILE = SYS$LIBRARY:GPSSDEF
QUAL = /MAP = NADS.MAP/FULL/CROSSREFERENCE
```

The first line defines the file containing the GPSS portion of NADS and invokes the TRACE option to the terminal. The second line defines the HELP blocks while the third and fourth lines specify other files used- the NADS object library and the GPSS system library. The last line specifies the qualifiers to be used with the VAX/VMS LINK command.

A production version of the GPSS may be prepared by using the SAVE CARD at the end of the GPS file but prior to the first START CARD. This causes the current state of the model; that is, the initial state of the model to be checkpointed to a disk file for later use by a read statement. This file is normally written as GPSCHKPNT.SAV and may be executed by using the following GPSS code, PRODUCTION.GPS.

```
########SIMULATE
########READ
########INITIAL    LS1/LR3
########RMULT      8551,7337              SET RANDOM NUMBER GENERATOR
########START      1
########END
```

A procedure to execute this GPSS which is equivalent to the QNP procedure described earlier is:

```
$ ASSIGN 'P1' FOR050
$ ASSIGN 'P3' FOR045
$ ASSIGN 'P4' FOR046
$ ASSIGN 'P5' FOR047
$ ASSIGN 'P2' FOR006
$ RUN TEST
PRODUCTION.GPS
$ PRINT/DELETE 'P2'
```

END

DATE
FILMED
2-87